

1651

HIGHMORE

HISTORY OF GENERATION

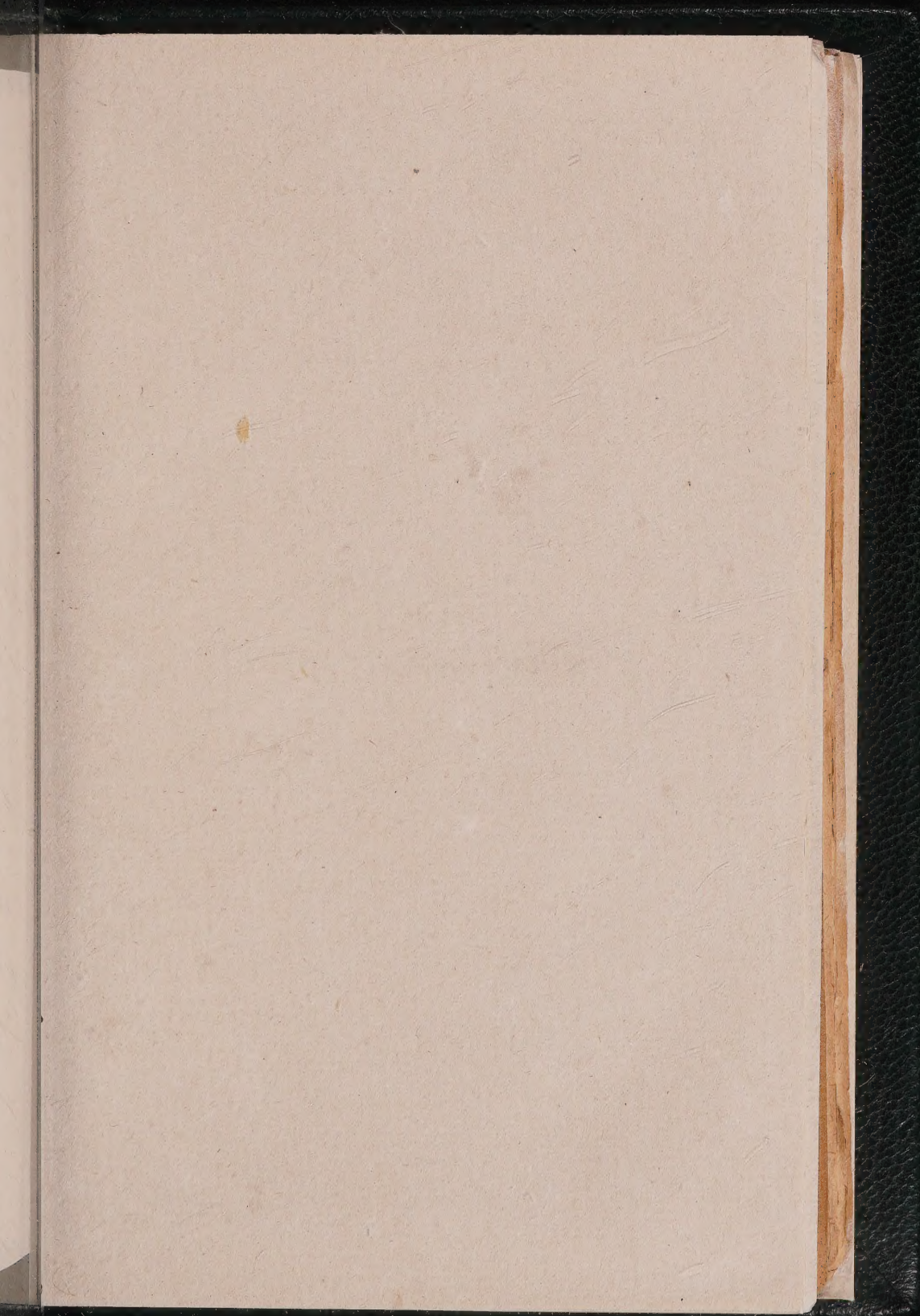






28678/A/1

HIGHMORE, N.
C





a26. 2, 10665



THE
HISTORY
OF
GENERATION.

Examining

the several Opinions of divers Authors,
especially that of Sir *Kenelm Digby*,
in his *Discourse of BODIES*.

With

general Relation of the manner of Genera-
tion, as well in *Plants* as *Animals*: With
some Figures delineating the first Originals
of some Creatures, evidently demonstra-
ting the rest.

to which is joyned a Discourse of the
CURE OF WOUNDS by SYMPATHY,
Or without any real applicacon of Medi-
cines to the part affected, but especially by
that Powder, known chiefly by the name of
Sir *GILBERT TALBOTS* Powder.

NATH. HIGHMORE lately of *Trinity Colledge*
in *Oxford*, Doctor of Physick.

L O N D O N,

Printed by R. N. for *John Martin*, and are to be sold
at the Bell in *S. Pauls Church-yard*.

1 6 S

0665

LIST OF
OF
GENERAL

to the Discharge of the

1860



1944-1945

THE UNIVERSITY OF CHICAGO
LIBRARY



To the Honourable,
Mr. ROBERT BOYLE,
Son to the Right Honourable
the late Earl of C O R K,
my much Honoured Friend.

Noble Sir,

WHere Virtue shall bee
found in conjunction
with Noblity in such
black, the last and worst times,
it no lesse invites and amazes
the eyes and hearts of be-
holders,

The Epistle

holders, then some new Star
or blazing Comet : but with
this difference ; the one is cause
of their fear, the other gives
life to their hopes and joy.
You have, Sir, so inricht your
tender years with such choice
principles of the best sorts,
and even to admiration mana-
ged them to the greatest ad-
vantage ; that you stand both
a pattern and wonder to our
Nobility and Gentry : who in
these past times many of them
have so spent their precious
Minutes, that they are scarce
able to account for one, or
spend an hour but in vice : that
cannot brook Virtue, because
it is not born with them ; that
hate

Dedictory.

hate all things that must be obtained by industry. Who most degenerately intrusting their wits as well as fortunes with their inferiours, have made them Master of both; a sad forerunner (I will not say Author) of these sadder times.

But you have made a better and far nobler choice, you have not thought your blood and descent debased, because married to the Arts. You stick not to trace Nature in her most intricate paths, to torture her to a confession; though with your own sweat and treasure obtained. Being ravisht, Sir, with these considerations of your worth and candor, I

The Epistle

shall not fear to throw these Papers into the bosom of your protection; from whom as I cannot misse a judicious censure, so I shall hope for a candid reception. They are Discourses which have busied the Heads and Pens of many judicious and learned, amongst whom our noble Author hath not deserved the lowest esteem. I shall not presume to these phanxies with their maturen births. Yet perhaps something may here be found, that may encourage others to a farther search. I shall not despair of your own, which may give a better account and a plenary satisfaction, if it may be

Dedicatory.

in these so labyrinthean works
of Nature, which is all I have
laboured for, and shall still be,
(as likewise for the preservati-
on of your health) the prayer
of

Sherborne,
May 15.
1651.

Your Honours most
humble Servant,

NATH. HIGHMORE.

1791
The first of the year, 1791, was a day of great
importance to the people of the United States.
It was the day when the first Congress of the
United States met in the City of New York.
The Congress was composed of representatives
from the thirteen original States, and it was
the first time that the people of the United States
had a voice in the government.
The Congress was organized on September 17th,
1789, and it was the first time that the
people of the United States had a voice in the
government.
The Congress was organized on September 17th,
1789, and it was the first time that the
people of the United States had a voice in the
government.



An Explanation of the following Figures in both Tables.

THe first Figure, of the first Table, shews the Kidney Bean opened; in which is a little crooked leaf folded up, which being displayed, shews it self, as in the second; and when, being set, it arises above ground, it is such a Plant as the third shews; with the very same leaves and no other.

The second Figure shews a Colewort seed: the first shews both leaves, with the stalk folded up, as they lie in the husk of the seed: the second shews it come up out of the ground.

The third Figure hath the small ger-men of an Ash; lying with his two leaves in the kernel of an Ash, both
in

The Table.

in the husk inclosing them. The second shews him sprung up above the Earth, at his first coming abroad.

The fourth delineates the young germen of the Pease in the midst of the grain, and its breaking forth.

The fifth shews the young Plant in the midst of the Bean : with the manner of his putting forth, with the same leaves displayed in the third, which are wrapt up in the first and second.

The sixth Figure displays the young Maple wrapt up in his husk ; and how he lies, as in the first : The second shews him a little unfolded, when it is taken out of the husk. The third shews him gotten from his shell, and the surface of the Earth.

The seventh Figure shews what progress the Chick hath made in his formation, in the third day after incubation.

The eighth shews the Chick perfectly formed in his shell not long before his exclusion ; with the Yolk almost whole ; describing the manner of his lying in the shell.

The



The second Table shews the growth of the Chick in the first dayes Incubation.

THe first Figure demonstrates the Eggs taken from their shels in a dish, with the Chalazæ, and Cicatricula : which in *A* that was never sat on, is but small. In *B* that hath endured the heat of the Hen one whole day, something dilated. In some new layed Eggs, I have seen it no more altered the third day.

The second Figure delineates the second dayes observations and change in the Egg; the large dilation of the Cicatricula, with all its Circles.

The third Figure shews the growth of the Chick, and alteration in the Egg, the fourth day.

The

The Table.

The fourth and fifth Figures, shew the fifth dayes addition to the former growths.

The fifth shews him taken from the Yolk, and White, with a delineation of all his parts, as they appear lying round together in the Egg.

An



An INDEX of the Chapters contained in this History of Generation.

THe opinion of Philosophers touching Generation. Chap. 1.

The Concept of Sir Kenelm Digby, touching the generation of Creatures, Chap. 2.

A short censure of the former concept, Chap. 3.

The true way of Generation set down in general, with the examination of some repugning Arguments of several Authors, Chap. 4.

*A more particular narration of the
way of Generation, Chap. 5.*

How Plants are generated, Chap. 6.

*How Animals are generated, especial-
ly Insects, Chap. 7.*

*How those Creatures are generated,
that are bred from Eggs. Chap. 8.*

*The generation of Animals brought
forth alive, Chap. 9.*

*How difference of Sexes and Similitude
with the generators is caused, Chap-
ter 10.*

*Several Arguments against this opinion
on proposed, and answered, Chap. 11.*

Fig: 1.^a

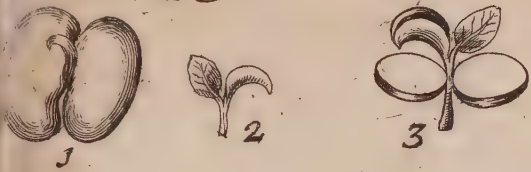


Fig: 2.^a



Fig:

3.^a

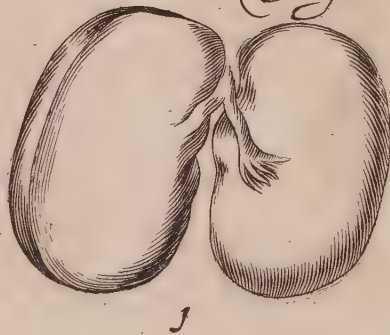


Fig

4.^{ta}



Fig:



5.^{ta}

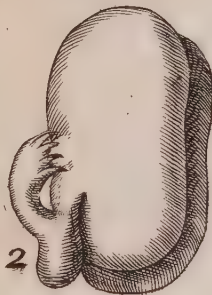


Fig: 5.^{ta}.

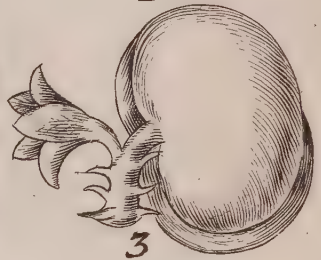


Fig: 6.^{ta}

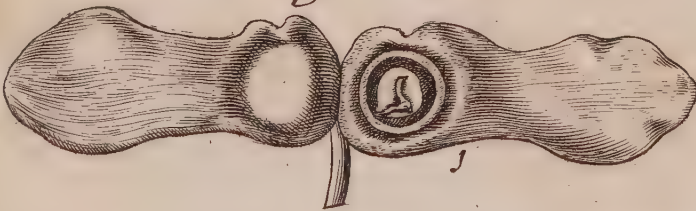


Fig: 6.^{ta}



Tab: 1.^a

Fig: 7.^a

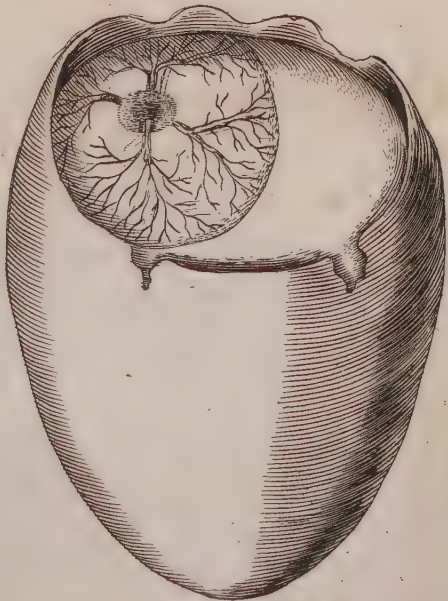


Fig: 8.th



particular narration of the

Fig: 1^a

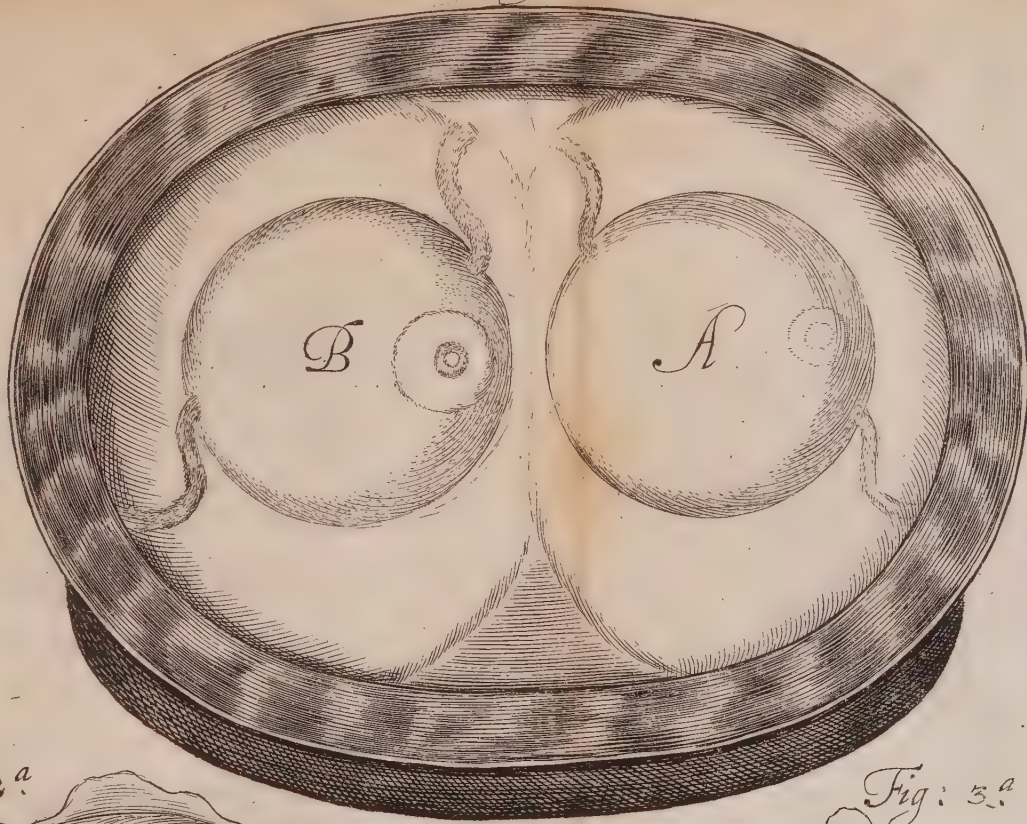


Fig: 2^a

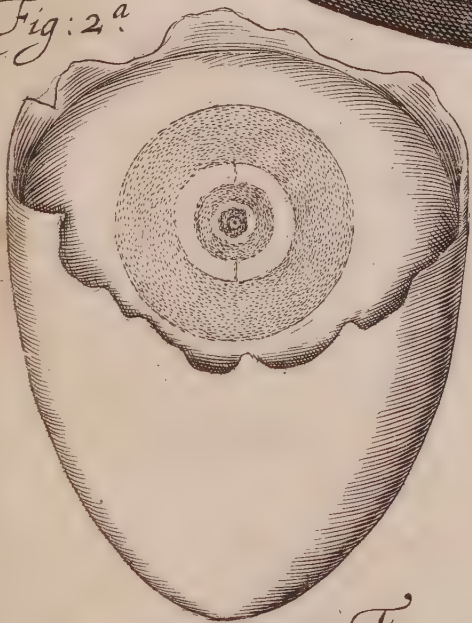
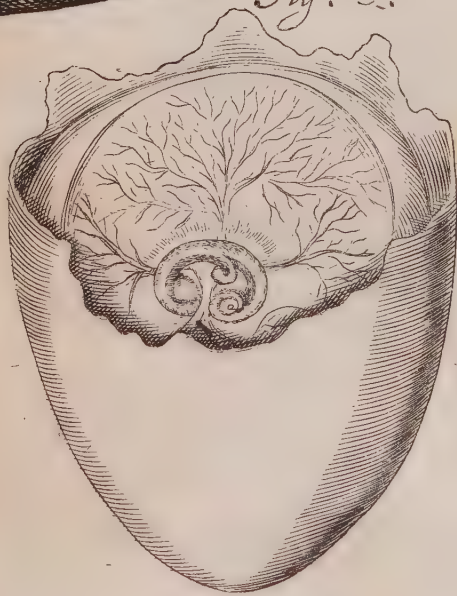


Fig: 3^a



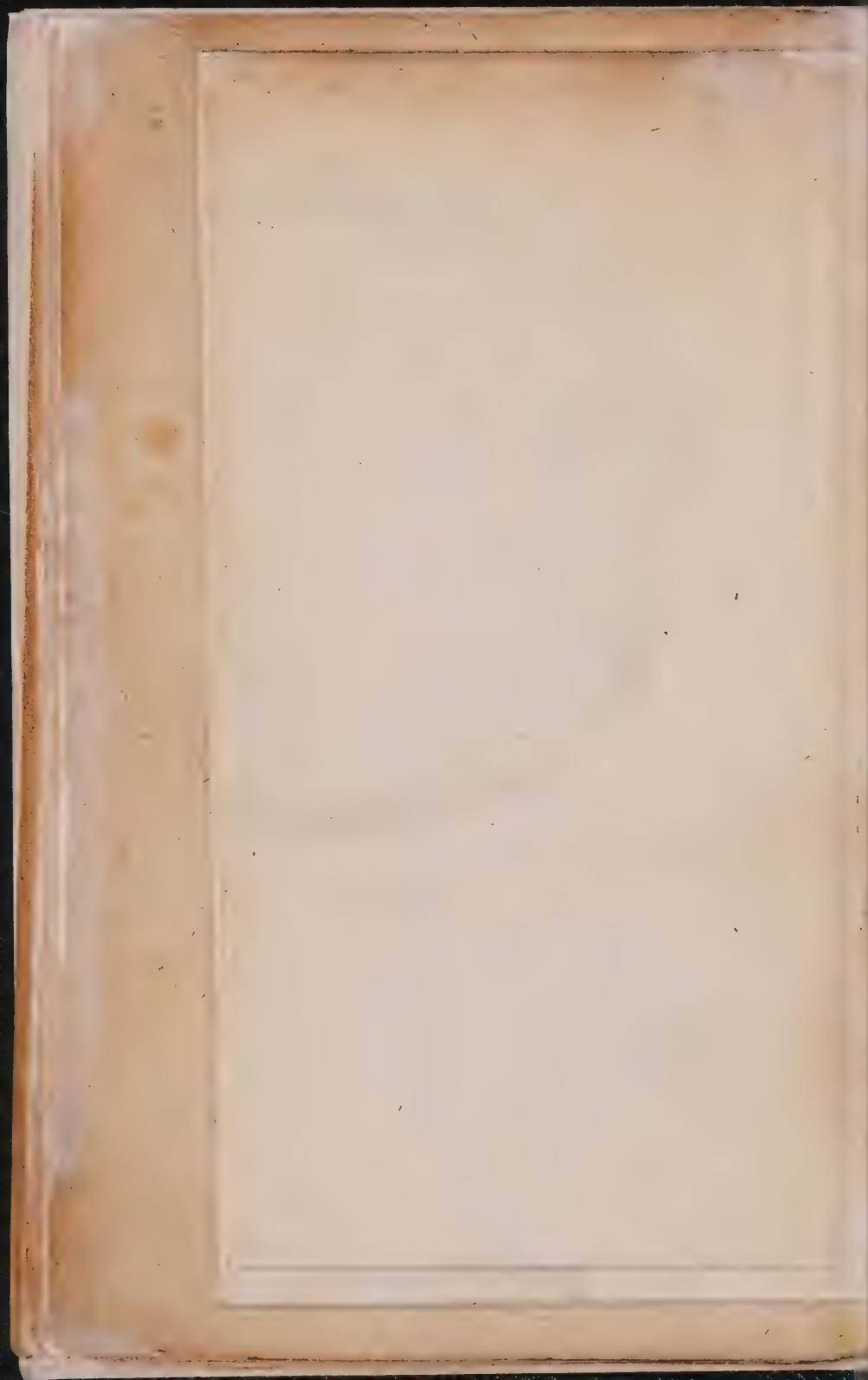
Tab: 2.

Fig: 4^{ta}



Fig: 5^{ta}





W

T

G

the

On



by

in

the

of

the

of

the

of

the

of



THE HISTORIE OF GENERATION.

*The Opinion of Philosophers concerning
Generation.*

Chapter the First.

THe ancient Philosophers have taught us that all subsisting Bodies consist of two parts, *Matter* and *Form*: the first they would have us believe to be compos'd of four jarring Bodies, which they call Elements, indued with as many proper qualities, which they called *Prime*: as if from the various mixture of these did arise all other qualities.

A . . . Some

2 *The History of Generation.*

Some later Philosophers, seeing themselves begirt within so straight and narrow bounds; and finding some effects much out-stripping the power of such a slender mixture, have told us of occult Qualities; which arise from some other Bodies not yet known or discerned in the compofure.

Our Chymists assure us for certain, that in the dissolution of all mixt Bodies, they finde other Elements besides those four, we received from the Ancients. And perhaps could their separations and putrefactions be as accurate to distinguish, as Nature is in the mixing, wee might finde many more, from whence these strange effects in several Bodies should arise. For indeed how can we imagine that the complicated and reiterated mixture of heat, & cold, moisture and drought, should ever produce those ridling effects of Mercury, the Loadstone, and many others. But this discourse I shall leave to those that have largely handled it.

The

The second part which they call *Form, ab informando*, they scarce tell us whence it comes; onely magisterially they teach us, (and we must believe them) that it ariseth from the power of the matter.

But how this, if rightly considered, doth agree with their own principles, seems somewhat difficult to unriddle, viz. How a Substance (as they grant all Forms to be) can subsist in an accident, which hath no being of it self, is no less a Riddle, then repugnant to their own grounds.

This some of our later Philosophers have very well discovered; and shewed us, that those Forms w^{ch} they thought and taught to bee but potentially in the matter, are there actually subsisting; though till they have acquired fitting Organs, they manifest not themselves. And that the effects which are done before their manifestation, (as the forming and fashioning of the parts wherein they are to operate) can rise from
A 2 nothing

4 *The History of Generation.*

nothing else but from the Soul it self. This likewise I shall leave to the Readers enquiry, and shall follow that other way of introducing Forms, and Generation of Creatures, (as well Animals, as Vegetables,) which gives Fortune and Chance the prehemineny in that work. A concept lately vented by the noble Author of the two Treatises, the one of Bodies, and the other of Mans Soul :: Where he describes the motions that are in Plants, (which are Nutrition and Generation;) to be, by one part transmitting unto the next to it, the juice which it received from that immediately before. So that there is one constant course from the root, (that sucketh this juice from the Earth) unto the top of the highest sprig. And the passage of this moisture from one to another, is in a manner but like the rising of Water in a Still: w^{ch} by heat is made to creep up by the sides of the Glasse, and so by the external cold is fashioned into that Body which at last it is. Let us hear him describing the manner of it himself.

The Concept of Sir Kenelm Digby concerning the Generation of Creatures.

Chapter the Second.

Chap. 23. **L** Et us frame (saies he) a
Sect. 7. **L** conception; that not far
under the superficies of the Earth; there
were gathered together diverse parts
of little mixed Bodies; which in the
whole sum were yet but little; and that
this little Mass had some excess of fire
in it, such as we see in wet Hay, or in
must of Wine, or in wort of Beer: And
that withall the drought of it were in so
high a degree as this heat should finde
no means, (being too much compres-
sed) to play his game: and that, lying
there in the bosome of the Earth, it
should after some little time, receive
its expected and desired drink, through
the benevolence of the Heaven; by
which it being moistned, and thereby

6 *The History of Generation.*

made more pliable, tender, and easie to be wrought upon, the little parts of fire should break loose; and they finding this moisture a fit subject to work upon, should drive it into all the parts of the little Mass, and digesting it there, should make the Mass swell.

This increase (saies he) of bulk, and swelling of the little Mass, wil of its own nature be towards all sides, by reason of the heat, whose motion is on every side, from the center to the circumference. But it will be most efficacious upwards towards the Air; because the resistance is least that way, both by reason of the little thickness of earth over it, as also by reason that the upper part of the earth lieth very loose, and is exceeding porous, through the continual operation of the Sun, and falling of rain upon it. It cannot choose therefore but mount to the Air, and the same cause that maketh it do so, presseth at the same time the lower parts of the Mass downwards. But what ascendeth to the
Air

Air must be of the hotter, and more moist parts of the fermenting Mass, and what goeth downwards, must be of his harder and drier parts; proportionate to the contrary motions of Fire and of Earth, which predominate in these two kindes of parts. Now this that is pushed upwards, coming above ground, being expos'd to Sun and wind, contracteth thereby a hard and tough skin on its outside, but within is more tender. In this sort it defendeth it self from outward injuries of weather, whiles it mounteth; and by thrusting other parts down into the Earth, it holdeth it self stedfast, that although the winde may shake it, yet it cannot overthrow it. The greater this Plant groweth, the more juice is daily accrewed unto it, and the heat is encreased, and consequently, the greater abundance of humors is continually sent up; which when it be- ginneth to clog at the top, new humor pressing upwards, forceth a breach in the skin, and so a new piece like the

8 *The History of Generation.*

main stem, is thrust out and beginneth on the sides, which we call a branch. Thus is our Plant amplified, till Nature: not being able still to breed such strong issues, falleth to works of lesse labour, and pusheth forth the most elaborate part of the Plants juice, into more tender substances : but especially at the ends of the branches; where abundant humor, but at the first not well concocted, groweth into the shape of a Button; and more and better concocted humor succeeding, it groweth softer and softer, (the Sun drawing the subtillest parts outwards) excepting what the coldness of the Air, and the roughness of the Winde, do harden into an outward skin. So then the next parts to the skin are tender; but the very middle of this Button must be hard and dry, by reason that the Sun from without, and the natural heat within, drawing and driving out the moisture, and extending it from the Center, must needs leave the more earthy parts much
shrunken

shrunken up, and hardened by their evaporating out from them. This Button thus dilated and brought to this passe, we call the fruit of the Plant; whose harder part encloseth oftentimes another, not so hard as dry. This drought maketh these inner parts, to be like a kinde of dust, or at least such as may easily be dried into dust, when they are bruised out of the husk that encloseth them. And in every parcell of this dust, the nature of the whole resideth, as it were contracted into a small quantity: for the juice which was first in the Button, and had passed from the root through the manifold varieties of the diverse parts of the Plant, and had suffered much concoction, partly from the Sun, and partly from the inward heat, imprisoned in that harder part of the fruit, is by these passages, strainings, and concoctions, become at length to be like a tincture extracted out of the whole Plant, and is at last dried up into a kinde of magistery. This

we

we call the Seed, which is of a fit nature, by being buried in the Earth, and dissolved with humor, to renew and reciprocate the operation described.

But a sensitive Creature (saith he) being compared to a Plant, as a Plant is to a mixed Body; you cannot but conceive, that he must be compounded, as it were of many Plants, in like sort as a Plant is of many mixed Bodies: But so, that all the Plants, which concur to make one Animal, are of one kinde of nature, and cognation. And besides, the matter, of which such diversity is to be made, must of necessity be more humid, and figurable, then that of an ordinary Plant: and the Artificer, which worketh & mouldeth it, must be more active. Wherefore we must suppose, that the Mass, of which an Animal is to be made, must be actually liquid; and the Fire that worketh upon it, must be so powerful, that of its own nature, it may be

be able to convert this liquid matter, into such breaths and steams, as we see do arise from Water, when the Sun or Fire worketh upon it. But lest this moisture being wrought on by such an active heat, should vanish quite away; we must suppose it to have such unctuous parts, that may hold them together; so that the heat imprisoned in this viscous liquid matter, riseth in bubbles: and by reason of its solid unctuousness cannot break forth, but stretch themselves longer and longer; and every one would be as it were a little Brook, whereof the chanel would be the enclosing viscous substance, and the inward smoak that extendeth it, might be compared to the Water of it.

This liquid smoak-like substance, the Fire works on in these Chanels, he makes to be three-fold; First, Watry streams, which first flie out, settle in the remotest parts, and is fittest for figuration. Secondly Oily, which give to the other continuance, and solidity. Thirdly,

Thirdly Fiery, which is made of the grosser, more fixt parts incorporated with Fire, having sufficient moisture to keep it flowing, and is like a Cauldron of fire; and these last vapours are for the continuance of heat. These three Brooks in a sensitive Creature, arise from three Sources or Fountains, the Heart, the Brain, and the Liver, and are convey'd in three severall Channells; the Arteries, Nerves, and Veins, and give unto the Animal, heat, sense, and nourishment.

A Short Censure of the former Concept.

Chapter the Third.

HOW much this Concept subverts the antique principles of Philosophy, I shall not here undertake to demonstrate: How far it shoulders out Truth it self, and so blots out those indeleble Characters, fixt by the finger of
of

of the Creator on every species; those inscriptions on all his works, the distinct constitutions, parts, operations, and figures (which are as so many Bushes, or Signes hung out, to discover what are the inhabitants within) will easily shew us. For if heat rarifying a substance, making it thrust it self into a larger space were the sole author of all generation; and were the cause why Plants grow up in stalk and leaves, and downwards in root: we must either admit those differing Characters to be vain accidental chances, or else look out some other agent, from whose fruitful womb, this variety might spring forth. If we but muster over the numerous Regiments or several species of Plants, and consider how this grows up with a square stalk, that with a round; some start up hexangular, others triangular; some bear a fruit of one form, some of another: and in them fashion seeds, of as differing figures as themselves. How the leaves

14 *The History of Generation.*

leaves also and flowers shew as much of variety, as skill in the Workman; every Plant being by them as soon discern'd, as seen. Let us call over likewise the differing numbers of Animals, Insects, and others; and examine all the starting holes, that Fire can breathe forth a stream by; all the casual compressures of cold, or external accidents; and compare them together, we shall see whether such a fruitful stock of variety in colours, shape form, vertue, and many other differing signatures, can be the issue of such accidental, and equivocal parents.

If this formation of Creatures arise from heat extending, and enlarging a small moistned lump; without any other consideration, why are not these Atomes extended circularly; and so all Bodies should be cast into the same Mould with the Heavens; and should, as they seem to us, be all sphericall. But he tells us of some light parts, that, besides the power of the Fire enforcing,
naturally

naturally climb upwards: and of others, which by their natural weight, are perswaded to sink into the Earth, to hold the mounting parts stedfast, that they may not be overthrown by Windes. But were there nothing else to give a figure to Plants, but ascending and descending, of light and heavy parts; whence should that variety arise in the fashion of those ascending and descending parts: the weight of the parts should carry them directly downwards, as the lightness doth upwards; and so all roots should descend in one continued round, but long, lump: what then makes some spherical, others stretching out infinite numbers of hairy threds; some directly downwards, others parallel to the superficies. The Author tells us the figures of them, as of the ascending parts, are caused by some external accidents: As when the more hot and moist parts are ascended, and broken from the prison of the Earth, the cold air compresseth and hardneth the

the external parts, and so enricheth this sprouting upstart, with a hard tough skin; both armour and clothes to protect the interior softer parts. The hardness of the Earth, likewise compresseth the descending parts, into such forms as we finde them of. But may not the truth of this be vehemently suspected; when, if we examine the coat, we shall finde it more penetrable then the Body: and more subject to external injuries, then that inclosed? as in all Trees and Plants, the Bark and Rinde is of a more flexible, tender, and soft composure then the invested Trunk: and the hard solid shell of Walnuts, Almonds, stones of Plumbs, &c. are invironed with a very tender substance. Besides this, there is yet a greater doubt, how this external cold air should in the same place, at the same instant of time, fashion these mounting Atoms into a round stem, with a long, sharp leaf: and close by that, compress others into a square, hexangular, or triangular

lar shape; with leaves round, jagged, indented, scollopt, or the like? as may be seen in several Plants, inhabitants of the same piece of ground, under the same Heavens, inviron'd with the same Air, and heavenly influences. These distinct figures cannot spring from the cold circumstant Air; for this applying it self alike to all, and every side of these ascending parts, should equally compresse every part; and so all Plants should sprout up cylindrical, as the Trunks of Trees do.

The Fruit also and Seed, which he calls a Button, or greater quantity of those hot and moist parts collected, and dust or parts dried into the form of dust, by the external heat of the Sun, and innate heat of the Plant; are in a more orderly method framed and dispos'd. For not onely in qualities, but in figure, they much vary one from another. One producing a seed inclos'd onely in a husk; another a seed of differing figure inclos'd in a fruit, and hard
B shell.

shell. Is cold Air the fruitful Mother of this variety too? Nay, if we but more seriously examine this dust, we shall finde it orderly set, with navell strings, affixt to some part of their inclosing Matrix; by which nourishment is conveyed for their growth, and subsistence. And if we shall further anatomize these dusts, we shall finde laid up in them Plants; the very same Identical Plants, which first grow up, after the seeds are committed to the ground. In which indeed resides the nature of the whole. And this young seminal Plant, we may truly call the extracted tincture, or Magistery of the whole Plant; as shall more largely appear hereafter.

Neither doth his 25 Chapter (where he endeavours to shew how this wonderful effect, as he calls it, is performed; how a Plant or Animal comes by that figure it hath) afford us any greater satisfaction. For if we examine his first principle, *viz.* That the several figures

of Bodies, proceed from a defect in one of the three dimensions ; caused by the concurrence of accidental causes; we shall finde it extreamly straightning the most delightful variety of the Creation, and the infinite power of the Creator. For upon these grounds it must be supposed, that the most perfect figure is to be cubical, and all Bodies should have been cast into that mould, but that some external causes stepping in, hinder almost all from obtaining that perfection: the Creator not being able to withstand their pre-
valency; or by patching up that defect, could not give perfection to all that, which his own mouth assures us was good. The examples also which he produceth, teach us there is but little truth in this position; for how can we conceive the watry drops of rain falling, should suffer violence (as to be pared round) by the softer Air, which is not able so much as to hinder it from falling? The fashioning of Salts

(as he relates) doth as little satisfie.. As for Alume, it is not of such unctuous parts as he reports; for how then could it so indiscernably be dissolved in Water, and so much resist Fire, which is not proper to unctuous Bodies? Besides, being dissolved and falling again, what should hinder the parts from meeting all in a lump, and conforming themselves to the fashion of the bottom of the Vessel, in which they are contained; as we see all unctuous Bodies do? As for Salt, if that should acquire his figure on the superficies of the Water as he informes us, it should be only long and broad, without thickness: whence then come those exact cubical forms in Salts, which are suffered to coagulate of themselves. Where you shall finde the most exact Mathematician out-gone by this natural Art. Neither is this caused by the falling of parts one upon another, (as hee speaks before of Alume) ere the former are thoroughly hardned: for then why

why should it not arise still in height, by the continual addition of descending parts, as long as there are any Atoms to fall, by which meanes it should not become cubical, but a long square. But we finde the contrary, while it most exactly casts it self into cubes; the angles sometimes looking upwards, sometimes transversely; which were impossible, if those squares were made, by long and broad Bodies falling one upon another. And vitriol, though calcined to perfect redness, if dissolv'd and fixt again, not onely recovers his bright shining greenness, but is squared out into various angles, looking every way, as if it had been fashioned by the hand of the Artificer.

The figure of Saltpeeter is almost neglected by him; onely he tels us, that by reason of its driness, it is more difficultly figured, and therefore is not equally increased. But if we examine it well, we shall finde it more unctuous, then the other two, and is more readily

readily cast into that figure, then the other. For it doth not onely shoot forth presently almost in water, after it is removed from the heat; but we shall finde it oftentimes upon new Walls shot forth to a great length, without the help of Water to fashion it in. So that there seems to be some more particular agent to be found out, that immediately imprinteth these determinable figures; which should rather work by a conceived designe of producing such a figure, in such a Body. How else could such effects continually be wrought, (accidental causes working not still alike) and therefore it were impossible to expect scarce a similitude in the works.

The formation of Animals affords us little lesse perplexity. How heat sending forth, or how those vapours emitted should settle themselves in such and such method and form; such variety of parts without some other director cannot appear. That there are

in all Animals three sorts of chanel, is an unquestionable truth; but that there are distinct Bodies conveyed by them, though taught us by our Masters, is not granted, nor by him received for a truth. For in the next Chapter we shall finde him applauding the circulation of the blood; and describing its motion through, and from the Arteries to the Veins, and from them to the Arteries again. Both of these chanel then must be filled with the same liquor; onely perhaps in the Veins it may be something cooler, and thicker; as our Bath waters are lesse hot in the gutters, then in the spring. That which is conveyed in the other chanel, the Nerves, we can scarce afford it the distinction of another Body; it being only the pure, and most subtile selected parts of the blood, which was conveyed in the other two chanel. Neither, if it were granted that three distinct Bodies, were continually traversing those three se-

veral chanel into the Bodies of all Animals; doth he shew us, how they put themselves into such various shapes and figures, (when they have escaped this conquering expelling heat) as we finde them wonderfully exprest in every creature.

All things arising in fumes & steams, as moist Bodies wrought on by heat will do, when they are freed from that which rarified them, return to their own nature and forms again. As Water rarified, (when those minute particles of heat that divides it into such small Atomes, and mixed themselves with it, are either lost or overcome by the watery Atomes,) returns again to water. Or if those particles remain still active, they do but further divide it; and so it becomes more like Fire by having a greater number of fiery Atomes mixed with it, yet is not made another thing, either in substance or figure. But in the generation of Creatures, it is far otherwise; where the
produced

product or effect is much differing from what the matter or the agent were. Now how this difference doth arise, and how this change is wrought, we must enquire a little further, then what heat and moisture will lead us unto.

The true way of Generation set down in general, with the examination of some repugning Arguments, of several Authors.

Chapter the Fourth.

HAVING thus far wandered in the search of a truth, examining those opinions which have endeavoured its discovery; and finding them much failing in their labours: I shall the more boldly attempt the same enterprize: hoping if I fail in so great a businessse, to passe along in the crowd, though not undiscern'd, yet favourably censured.

The

The production of all Creatures, after the first Omnipotent *Fiat* was executed; is by Philosophers called *Generation*. Which is performed by parts selected from the generators, retaining in them the substance, forms, properties, and operations of the parts of the generators, from whence they were extracted: and this *Quintessence* or *Magistry* is called the *seed*. By which the Individuals of every Species are multiplied; and that which the Almighty for its transgression, made to have an end; by the fertility of this Sperm, is continued to immortality.

From this all Creatures take their beginning; some laying up the like matter, for further procreation of the same Species.

In others, some diffus'd Atomes of this extract, shrinking themselves into some retired parts of the Matter; become as it were lost, in a wilderness of other confused seeds; and there sleep, till by a discerning corruption
they

they are set at liberty, to execute their own functions. Hence it is, that so many swarms of living Creatures are from the corruption of others brought forth: From our own flesh, from other Animals, from Wood, nay, from every thing putrified, these imprisoned, seminal principles are muster'd forth, and oftentimes having obtained their freedom, by a kinde of revenge feed on their prison; and devour that which preserv'd them from being scatter'd.

Neither are these without their subordinate forms; for from the walls of their bodies frequently, broken by corruption, issue forth other Creatures, differing in *specie* from themselves; as whosoever will but examine the production of *Insects*, shall easily finde.

This seed consists of two parts, *Material Atomes*, animated and directed by a spiritual form, proper to that species whose the seed is; and given to such matter at the creation, to distinguish it from other matters, and to
make

make it such a Creature as it is. Both which are separated, the Material Atomes from the body ; the form, from the form of the generator. Which in Vegetables, and sensitive Creatures, where the forms are composed of material substances, our Philosophers are easily perswaded to believe. But how the immortal soul of man, should be communicated to these corruptible material Atomes of the seed of Man, without prejudice to its most pure nature, seems a Riddle to our Philosophers, and impiety to our Divines. I shall not undertake those large disputes *pro* and *con* about this argument, but do believe the Soul of Man may be traduced, though not generated ; may spread and multiply it self into many, without fear of corruption. It being a substance incorruptible, immortal, like the Creator, the breath of his own mouth, which still retains so much of that nature, from whence it was breathed ; that without the least diminution, it
is

is able to communicate, and dilate it self into many Millions, and yet still remain the same entire substance that at first it was.

For the material part of this seed, there is a large dispute, whether it be *à toto vel à parte decisum*. I shall not stand to tell you the names of those that are Patrons of the one, and of the other: nor rehearse their Arguments. If you examine them, you shall finde theirs most rational, that affirm the decision from the whole body; what we finde more particularly discours't of by our forementioned Author, in his 24 Chapter, we shall take up and a little review. Where he hath truly and fully evicted the wandring phancies of some, that would have this compound of severall parts, to be collected from every particle, so as passing by, or through every little Atome of the Parents body, in its passage; should be impregnated, and imbued with the nature of it, and so retire to the reserve where

where it is kept for generation. And afterwards these particles being fermented by convenient heat, do take their posture and scituation; according to the posture and dispositions of those Atomes they visited in their passage, and from whom they received those imbibed natures. But this circulating our Author tells us, is impossible. I will not wrong him so much as to rank his more solid reasons with mine own. Could we finde these channels and conveighances in the Body, by which this matter should passe; yet I might doubt of the unquestionable verity of this doctrine. For what should hinder this matter circulating about the Body, from receiving qualities, and so likewise the nature of every part it passeth by; and so every particle of this matter, should be impregnated with the natures of the whole; and every small Atome should become a living Creature, or else the Subsequent should blot out the Antecedent Character;

Character, and the impressi^{on} should be onely from the last part. We may likewise as truly, as safely conclude with our Author, that it is impossible for every little part to remit some parts impregnated with the nature of that whole part from whence it fell. This by some is thought to be done by that *Quasi epilepsia in coitu*, that kinde of convulsion or concussion of the parts, by which is shook off from them somewhat retaining the nature, and property of every part, and these being joyned, make up the Seed. This seems to be very much befriended by our Authors relation of the Cats kitned without tails: and the Womans daughters with six fingers upon a hand. My self also have seen a kinde of Poultry without rumps: which breeding with their own kinde, still brought forth Chick^{en} wanting that part: If with others, sometimes they had rumps, sometimes but part of a rump. And not long since I saw a Mungril Bitch, that had her
tail

tail cut close to her body almost, whose Whelps were half without tails, and half with tails: the next year following, she brought them forth all with long tails, as she had before the cutting off. Which though it seems to favour (as I said) this opinion, it doth no way confirm it; as may appear by the more frequent perfect generations of mutilated creatures; which beget children or issue with two legs or arms, though they had but one; Spaigniels, whose tails are always cut, bring forth Whelps whose tails need as much cutting, as their Dams or Sires did. Wee must therefore look out some other way, how this may be done, without the parts themselves.

Some others have supposed this decision to be made from the blood, when it is *tantum non assimilatus*; after it hath undergone all its concoctions, and received all its names christned by the *Arabians*, of *Humoris in nominati*, *Rorris*, *Glutinis*, & *Cambii*: and is fastned

to the part, but not perfectly assimilated; and this being selected, and reposit-
ed in convenient vessels, receiving
some kinde of impressiion from the
part from whence it was divided; it
retains still an imperfect signature, and
delineation of them; and makes up that
which we call the *sperm*. But I shall
here want Anatomie to instruct me,
how this Cambium, this thinner, or
not yet confirmed, or hardned sub-
stance of every part, should desert its
hold; and being shaken off, should be
conveighed into the seminal Vessels. All
which, returns to the first opinion con-
futed by our Author. Who hath like-
wise fairly cleer'd the other part of the
doubt, whether this matter be divided,
or taken only from similar parts alone,
and so the matter of bone, should ac-
cordingly to the conveniency of place
and use, become round, blady, circu-
lar, or long, and the flesh likewise,
only by the help of fermenting heat.

After our noble Author hath so stre-

C nuously

34 *The History of Generation.*

nuously confuted these phantasies, we shall finde him laying down his own opinion, and seeking some other means and course of Generation: He tels us, that the superfluous part of the nourishment, when it is drained from the rest, and reserv'd in a convenient place: by little and little through digestion gaineth vigour, and spirits, and becomes a homogeneal body, like to other simple compounds; which by other degrees of heat and moisture, is changed into another substance, and that again by other temperaments into another. And thus by the course of nature, and by passing successively many degrees of temper, and by receiving a totall change in every one of them; at length an Animal is made of such juice as afterwards serves to nourish him.

But if we more seriously examine this assertion, we shall finde it to leave the truth very much behinde it. For first, if we but look on the Body to be nourished; we shall finde it to be com-
pos'd

pos'd of many several parts. of differing natures, which would sufficiently instruct us in the disagreeing and heterogeneous particles of that which nourisheth this heterogeneous Body. But if we more curiously anatomize this juice or blood, it will abundantly shew us, it is no homogeneous Body; neither therefore can that superfluous part selected and drained from it, claim that privilege.

Should we grant this, it cannot appear how heat working upon this homogeneous body, should make in it a total change in the nature of it; or create it an other substance quite different from the first, making it lesse homogeneous. And in every digestion or operation of heat upon it, it should become still lesse homogeneous, until that substance be produced which wee see compos'd of so many heterogeneous parts. If we examine the workes of heat, we shall finde it penetrating, dividing, and mixing of small particles of

it self, with the Atomes of the bodies it works upon; and in progress of time, divides the body into such small indivisible parts, that it becomes like it self, in respect of rarity. As Fire working on, and mixing it self with Water, divides it into small indiscernable Atomes, which now attains unto the same rarity, and lightnesse with the Fire; and being accompanied and intermixt with those fiery Atomes, flies aloft, till at last disliking one anothers society, being far removed from the Agent rarifying them, they part companies. And then those unseen Atomes of Water, collect themselves again to their former temper, and bulk, no whit changed or altered either in qualities or substance, which were impossible, were this change total, or could this action of heat create heterogeneous parts, in this homogeneous substance. If we further consider the power of heat, (or any other qualities) we shall surely finde, that in no action there can any
substantial

substantial thing be given, which is not originally in the agent, or giver. Fire could not give heat, nor Water, moisture, unlesse it were inherent in those Bodies. Neither can heat or Fire working on an homogeneal body, give it any other heterogeneal parts then fiery ones; nor moisture, any other; then moist ones, which indeed accidentally may give hardnesse to bones, and softnesse to flesh; but how comes this bony substance in this place blady, in that round, in another long? this Muscle round, that triangular? this Plant of one form and nature, that of another? We must seek out some other agent to fashion these parts, and to compose this difficulty; and confidently conclude, this way to be lame, and imperfect; of which our Author seems to be conscious, and that makes him so staggering, and at last falling upon an opinion, which he before in part rejected, *viz.* That the blood in its circulation visiting every part, is impreg-

C 3. nated

nated with the nature of them, and the purest part of this blood being extracted like a quintessence out of the whole Mass, is reserved in convenient receptacles till there be use of it; which is the seed, of which a new Animal is to be made. This imbuition of specific qualities from every part, will appear as impossible as the former. For first, there are many parts from which the blood doth not again return, as from all those parts, which have attracted their specifick nourishment from out of the vessels; from them there is no return made. Besides, the blood, in its circulation, is carried in vessels of the same nature, from the one end of the body to the other; and out of those vessels there is not the least motion in the blood. How these qualities should be communicated from every particle, through the thick skins of the vessels, seems somewhat strange. Besides all this, should we grant this circulation through every particle, how comes

comes it to passe that receiving so many differing qualities, the one doth not confound the other, and that which is last imprest doth not blot out all the rest? These or the like difficulties being kenn'd by our Author, makes him flye to another refuge; and to tell us, that the heart of every perfect Animal, containeth in it, the specifick vertues of all the severall parts of its own body; by reason of the bloods continual resorting to it, in a circle from all parts of its body, and its being nourished by that juice; so that the Heart is the abridgement of the whole, and imbueeth the blood with those specifick qualities, from whence is extracted the seed. But neither can this cleer all the former difficulties. For how shall we suppose, so many distinct qualities to be imprest in so narrow a compasse, as in the heart, without confusion; or how so short a stay in the heart, could implant such a numerous Regiment of qualities in the blood; or why not differing

C 4

fering faculties in the same particle of blood; all sliding (without distinction) through the ventricles of the heart? we shall be forc'd therefore to seek out some other way, which indeed our Author hath chalkt out unto us, though himself hath not trod in it.

A more particular Narration of the way of Generation.

Chapter the Fifth.

OUr noble Author hath laid this ground for us, which I hope will easily lead us to the truth, *viz.* That it is necessary the parts should be made in generation, of a matter like to that which maketh them in nutrition. Now what that is from whence every part receiveth his nourishment, wee must search for in the blood: Which is a tincture extracted from those things we eat, concocted and separated in the Stomack,

Stomack, Liver, and Heart; and afterwards by its circulating in the Arteries and Veins, is pellicanized (as the Chymists term it) and becomes most pure, and defæcated from all its excrements, and is made a fit nourishment for every part. The things we eat are not simple, but compounded of as great a variety as the parts to be nourished can expresse. What variety of Plants goes to the making up of one piece of flesh we eat? What multitudes of differing Atomes are conjoyned in one piece of bread, or draught of drink, or Wine? The extract then sure must be furnisht with as great a swarm of differing parts; onely here they are more refin'd, more subtiliz'd, and separated one from another. But how doth this variety of parts in the blood, make it the fitter for nourishment? by comprehending in it small indivisible particles, cognate or similar Atomes, which are of the same substance, essence, and nature with the parts, to
which

which they are to be adjoyned, and assimilated: and want nothing but separation, and afterwards union and conjunction with, to be part of those particles, for whose nutriment they were provided; which operation is called assimilation. For then these similar, or cognate parts, are become like to those, to which they are joyned.

How nutrition is made.

And this is the matter and manner of our nutrition, w^{ch} if slightly considered, may perhaps go amongst the number of falsities. But if we examine from the Creation, the product of Creatures from the confused first created Chaos; or since that time, the continual hourly decay, or expiration of every part of us, (in so much that Physitians allow us clearly a new Body every seven years,) we shall soon discover the truth of this position. How the great Architect fetcht from the bowels of this Lump, pre-created particles, to supply him with fit matter for such bodies; and appropriated

priated forms for such matter, will instruct us that there are such particles, which being brought together constitute such bodies. The continual expiration of particles from all bodies, will more clearly illustrate it. The hourly decay is by expiration of material, the last dissolution is both of material and formal Atomes. Now as all agree that material parts throughout multitudes of (nay all) mutations, remain incorrupted; so also according to, not onely the judgement, but several experiments of knowing men, diligent inquirers into the various works of Nature, and mutations of natural compounds; natural forms themselves also do not perish at their parting from their matters; but onely are dissolved and dissipated, lying after that in their scatter'd Atomes, confused and mixt with some others; constituting perhaps a quite differing body; so that the entity of the form, continues after corruption; though not in the formality of
such

such a form. If it be so then that the matter of every particle in every body, and the Atomes of their forms likewise, still remain, though scatter'd into millions of several bodies; what should hinder, (when these Atomes are again rallied,) an easie union with particles of the same condition, and nature? and why should not then the blood, which is made up of many and distinct bodies, be furnisht with the several Atomes comprehended in those bodies: and those Atomes being agreeable to our parts, be as easily united to them?

The way of nutrition being cleared; let us see now, how from the same matter generation is performed. This blood, that all parts might be irrigated with its benigne moisture, is forc'd by several chanel, to run through every region and part of the body; by which means every part out of that stream, selects those Atomes which they finde to be cognate to themselves. Amongst
which

which the Testicles (destined to that office from their first creation, as the Stomack and Liver were to digest) abstract some spiritual Atomes belonging to every part; which had they not here been anticipated, should have been attracted to those parts, to which properly they did belong for nourishment. As the parts belonging to every particle of the Eye, the Ear, the Heart, the Liver, Stomack, Guts, the Hand, every particular bone, and muscle, &c. which should in nutrition, have been added (to repair the continual deperdition) to every one of these parts, are compendiously, and exactly extracted from the blood, passing through the body of the Testicles; and being in this Athanor cohobated and repositied in a tenacious matter (lest being spiritual, and very fine, they should lose their vigor) at last, passe from the body of the Testicles, by certain vessels, in which through infinite Meanders, it undergoes another digestion and pelli-
canizing,

canizing, (as in another place I havee shown.) And from thence, being now delivered from all its excrements, and furnisht with Atomes, fit for the making of every part and particle of another Individuall; is treasured up in certain Granaries, till the seed time comes. And this is the nature, substance, and manner of collecting the Seed. This shall be further illustrated by the severall wayes of Generation in severall Creatures, and first in Plants.

How Plants are generated.
Chapter the Sixth.

THese seminal Atomes are in the same manner separated by all Vegetables, w^{ch} are watered in every Region by a certain juice, or blood which they attract & suck from their Mother Earth: which is nothing else but a confus'd Mass of multitudes of forms, and substances.

What the Earth is.

fit

fit for the nourishment and reparation of all things. In which a Plant being fixt, presently sends forth his Purveyers on every side, his roots, wch supply the want of hands and mouth, to bring in its provision; who are finely palated too, & able to make choice of that tincture, which most delights their palats, best fits their own diet, and is most proper to repair their decaying selves in every part. This juice or blood they concoct, & strain through their finer parts; and separate them from other earthly excrementitious particles, (or such as belong to another species) till it becomes fit only for the repairing of that Plant, for, and by which they were selected, and suckt out of the Earth. From this quintessence, this juice, are selected parts of the same substance, nature, qualities, and form with the Plant, and agreeing with every particle of it, whose blood it is, and from it, is the species propagated. But not after the same method, in all, for
in

48 *The History of Generation.*

in some, propagation is made by this juice residing in part of the Plant, pulled from the Trunk, and fixt in the ground: In others, by part of the root transfer'd: In others, by seed.

The first is done by that juice which is retained in the part taken from the

*How a Sprig
put into the
ground grows.*

Plant, which reserving parts fit for the nourishment of every particle in the Plant, from whence it was taken, hath now some parts which are vessels, for that Sprig which is to be propagated. For those Atomes which in the juice were to augment and repair the root of the Tree, being rapt from the Tree, are of no use, not having a root to adjoyn themselves unto. Being therefore not attracted by any part of the Sprig, as not cognate and fit nourishment for them, by often circulation about this beginning Plant, are at last united, (other parts being drawn from them) and by their freedom from those parts, and union, become

become more vigorous, and will not be idle; but since they cannot be employed, drawn by, and adjoynd to other parts; they will set themselves to work, and falling to their proper place, the lowest region of the Sprig, collect themselves in the same method they should have done in the root, to which they should have been adjoynd. And there finding the bark softned by the external moisture of the Earth, and fitted to give way to them; being thus settled, they thrust forth themselves into the Earth; from whence they extract cognate juice, with all sorts of Atomes fit for the augmentation and nourishment of themselves, & the whole Plant. And thus grows up a Plant of the same kind with the old stock.

The 2^d is performed by these seminal Atomes residing in the top of the root; each part being separated, acts in the same manner as it did in the whole Plant.

The last sort is by Atomes, selected from this juice, when the Plant is

D grown

grown to his full bigness, and wants no more for his further growth at that time, and laid up together in convenient receptacles: which is a more perfect operation of Nature then the two former are.

In the former wayes, these Atomes lye confused in the juice; and are not separated, but by the parts to which they are to be adjoyned. But in this these Atomes are methodically reposed, and laid up in such forms, as they appear to be a very Plant, inclosed within a skin, with such leaves as they discover themselves with, at their first breaking the Earth. The Atomes belonging to the root, the stalk, the leaves are all laid together, and set in their right places, and make up a perfect Plant, the very same which first comes up out of the Earth. If the Seed be great, they are easily discovered. In the seed of the Ash, the skins being removed, in the middle of the kernel ye shall finde two white tender leaves lying

lying one upon another, with a stalk reaching to the point of the seed, (not that which is fastned to the tree, but the other) to which is loosely adjoyned, as it were, a navel string from the stem, conveighing nourishment to this young Plant, while it is upon the Tree: as in the third Figure of the first Table is delineated. In the Maple, both greater and lesser, though the seeds be winged as the Ash, yet these seminal Atomes or this young Tree, is inclosed in the round knob; within whose tough and harder skins, is found a stalk and two leaves rowled round together, which are the very same that first comes up: as in the sixth Figure is discovered. In Beans and Pease, betwixt the kernel, you shall finde those very leaves which first break the ground, with a stalk, whose end passeth through one of the thicker skins, and is contained onely within the outermost thin skin: as in the severall faces of the fourth and fifth Figures is described. Which if it

be any way moistned by an adventitious moisture ; presently gives way to the swelling stalk and leaves, which when they are distended beyond the capacity of the outmost skin, break forth and shew themselves. In other smaller seeds, the leaves are inclos'd and rapt round, the stalk lying betwixt them ; as in the Cabbage and Radish seeds ; figure the second. But when they break through the ground, they erect themselves upright, sometimes carrying the hard skin up upon their tops. The greater seeds have, besides these small plants, a substance which we call the kernel ; unto which their stalk is fastned, neer about the middle of them, by two short stalks ; from which substance they receive nourishment, while they are inclosed within their skins, and matter afterwards for the distention of the stalk and leaves, after they have enlarged their territories, both upwards and downwards, in root and leaves : as in Beans, Pease, Wheat,

Wheat, Barley, Acorns, whose parts turn into a milky substance, fit nourishment for these tender Plants. That these seminal Atomes do conform and dispose themselves likewise, according to the same method they did, or should have done in the Plant, whose they were, or for which they were prepared for nourishment, will easily appear by that artificial generation of Plants, which not onely casually hath fallen out, but by many hath studiously been effected. When from the powder or liquor of Plants, (as is related by *Libarius*, and others, I need not name the Authors being so common an experiment) they shall again be recalled to live, and start up stalk and leaf; which but now was dust, or liquor. I shall onely relate one experiment casually, though twice made by a learned grave Physitian, neerly related to me: which will explain the manner of this operation to the full.

Having in the evening expos'd a

D 3

decoction

54 *The History of Generation.*

decoction for a clister (made of Violet leaves, Strawberry leaves, Mallows, and the like) to the cold of the night. The next morning he found it covered with a slender crust of Ice, which gave him leave through it to behold in the Water, the leaves in their perfect shapes, of all those Plants, of which the decoction was made, both in fashion and colour; which remained in that posture till the Ice was broken; which was no sooner done, but all those fictitious Plants presently vanished, nothing remaining but the cleer liquor of the decoction.

Now how this could be performed, unlesse it were by the union of these seminal Atomes dispersed in the liquor: (drawn from the other parts, by the gentle heat of the Fire acting with the Water) disposing & settling themselves in their right and natural places, will appear impossible. How could a slender heat in so short a time give a form or square out such a matter into that
figured

figure which but now it lost? or why when the matter is thus fashioned, should it not retain that figure and bulk when the inclosure is broken? We must therefore conclude, that these seminal Atomes of the Plants, which were separated from the other parts by decoction, and by the sudden closure of the Ice intercepted from flight; were actuated by some remaining particles of heat, and put in minde of their office and nature; insomuch that every Atome began to seek out his proper situation and neighbour, to settle themselves in such method as they held one towards another, before they were parted from the Herbs, and so make up perfect Plants both in figure and colour. But the Ice being broken, and the liquor moved, these appearing Plants, being made of such fine spiritual parts without cement; were soon shattered into their first indivisible particles; which being again dissolved, and the order broken, could not be by the sense discerned.

The reason why these seminal Atoms could not then constitute a perfect solid Plant, was, because there was wanting some other more fixt parts of the same nature, and condition, with these more spiritual, to conserve them in that posture, and to cement them together; to fix and harden them into a consistence. These are of the same nature, particless belonging to every part, Atomes of Leaves, Stalks, Flowers, Fruit, and Root as the others; but are grosser, more terrestrious, which cannot act themselves; but give solidity, strength, and hardnesse to the other when they are joyned together; and are so exactly united with them, when the Plant is entire; that they cannot, but by dissolution of the whole, be distinguished. These in this decoction, were left behinde in the expressed Stalkes, Rootes, and Leaves, and therefore the Plants were not permanent.

The

The consideration of these two parts in the constitution of a Plant, will give us a light of the cause of the diversity of the Sexes in Animals; whose way of generation follows next.

How Animals are generated.

Chapter the Seventh.

THE generation of Animals is as various almost as their several Species; whereof some derive their Pedegree from the corruption of Dirt, Mud, and other Animals; some arise from the funerals of Plants, and start up a moving sensitive piece, which but now grew a vegetable. Others again of a more noble Progeny, owe their beginnings to some seminal parts derived from the Genitors; but reposed in certain vessels excluded from the Females, and left without the sphear and guidance of their forms; such are all
births

births breaking forth from the inclosing walls of Eggs. The more excellent Animals after their formation, are contained (till they acquire some degrees of perfection) within the precincts of one of the generators. All which, or the most of them, I shall prosecute in the following Discourse.

The first rank of Animals arising from corruption of other creatures (as Eeles from Mud; Flies and Wormes, from Beasts; the Scarabeus from Oxen; Lice from the filth of most Creatures.) These I say, grow up upon the mutual juncture of such Atomes, which before lay scattered in the bowels of some other compound; and wanted nothing but union, to fashion them into such a frame and structure: which, as soon as possible they can obtain their freedom, put themselves in rank and order, and become another living thing, differing from that Species whence it had its birth. This is seen in the Mistleto, which grows upon

on other trees, very evidently; the juice which nourisheth and constitutes this Plant, is drawn from the Earth, with the juice belonging to the other tree it grows from, and is perfectly mixt with, not to be discerned from it; till after long circulating about the several parts of the tree, it is refused by all as unfit for them. At last uniting in small lumps, they discover their differing natures, by parting from the parts of the tree, and when they are in such a proportion united; thrust out those stalks, and leaves and fruit, which we call Mistleto. These particles of the Mistleto may be discerned united in small lumps, a good way from the eruption out of the tree; where ye may finde many small green drops, as it were, hardned, inclosed in whiter wood of the other tree. So these seminal Atomes, taken in with the ordinary nourishment of those creatures, are carried up and down through their parts; but received of
none,

none, to be perfectly united with any; but being dispers'd in small parcels, they cannot easily unite themselves, till a greater portion of them be met together; w^{ch} generally is at the Spring, when the Suns heat begins to contribute vigor to them; and dissolves the excrementitious humors of the Body they are inclosed in; so that they much easier obtain their freedom, and so uniting themselves in their proper method, and order, become such creatures as those Atomes can fitly constitute. These Animals too, sometimes alter their external forms, and become another thing then what at first they seemed to be; as from a Worm, the next advancing Sun salutes a Butterfly; such is the growth of all Insects, which appear first to be Worms; the Tadpoles grow to be Frogs; the spitting or eggs of Flies, to be Worms, and then Flies again; which is caused by the addition of new parts, which they themselves procure from their nourishment;

nourishment; by which these parts become larger, solider, and so discernable, which before could not be seen. As the germen or young plant in the seed, when it hath obtained a new stock of moisture and nourishment, puts out leaves of a differing form from those which first come up; as the Maple, Borage, Cucumber, and almost all plants differ in their second leaves, from their first, which manifestly appear inclosed in the seed. The other are so small and wrapt up, that until there bee new parts adjoynd from their nourishment, they are not discerned.

These imperfect Animals spring not up alike indifferently, from all Bodies; some Animals being made of one kinde of Matter, some of another; some Plants retaining the seminal Atomes of one Insect, some of another; so that from one Plant or Animal ariseth one kind, from another, another. I shall not stay to look out their several originals,

The

*The way how those Creatures are generated
which owe their beginnings to Eggs.*

Chapter the Eighth.

THE other two more perfect generations, are made by the conjunction of these seminal Atomes, extracted from both generators: who both of them contribute such Atomes, as being layed together in their proper places, would constitute an Individium of that Species. One of which incloses and layes up these united sperms, with a proportioned quantity of nourishment, for the growth and perfection of the Fætus, in an Egge. From which all Fowles, most kindes of Fishes, Snakes, Spiders, Frogs, and some other Creatures are brought forth. This Egg is compos'd in the Matrix of the Females, and is the product of these seminal Atomes selected from the nutrimentall juice

juice of both ; the Femal adding those parts fitted for the growth and nourishment of the Foetus, from her own blood. The yolk, the grosser aliment, is composed in the Vitellary, or Egg-bag, selected from large vessels immediately arising from the Aorta. The other part, the White is made in the Matrix, by a certain milky viscous exudation, flowing from the rough wrinkled membranes of the Womb ; whose property it is to convert that blood, which by several great vessels is brought to it, into that milky spermlike substance.

Besides these seminal parts there is (I say) a contribution of nourishment conveyed with them in the same Egg, for the nourishment and growth of the Foetus, while it is inclosed in those walls. And this is, as I said, of two sorts, agreeable to their double use, fitted for their nourishment while the Atomes are uniting, but tenderly cemented, and growing together : and
this

this is the White, which is more agreeable to the nature of Sperm; and answers to the Mothers blood, which gives growth and nourishment while the Foetus lives in the Mothers womb.

The other, the Yolk, of a more solid and confirmed substance, is for its nourishment when it hath atchieved some perfection and growth; the parts then expecting a more solid nutriment. This supplies the use of Milk in other Creatures, who for a time after their exclusion are nourished altogether by it.

Both of these, White and Yolk, are inclosed in Membranes; some of which being hardned into a shell, are excluded from the Femal daily as they grow to perfection. And that because such small bodies as these Ovipara are, cannot contain so numerous a progeny together, as their fruitful wombs do yearly disclose.

In which none of these parts, either White, or Yolk, these seminal Atomes
are

are repositèd, is doubtfully related. Some affirming them to reside in the Center of the Yolk. But this will easily be rejected, when ye shall see the whole Animal framed, and the Yolk yet entire, whole, inclosèd within its own membrane: onely some small threadlike veines full of blood ye may see thrust into it, conveighing some of it, as nourishment, to the Fœtus.

Others think the White to be that, of which the Chick is framed and fashioned; but not rightly neither; for that likewise is to be seen whole, when the body is formed.

Fabritius, who hath taken a great deal of pains in dissections, a strict enquirer into Natures secrets, especially concerning the manner of Generation, supposes these parts to reside in the *Chalazæ*. that part which by our Women is called the treddle. But this likewise is false, for then every Egg should produce two Chickens. there being one treddle at each end of the Egg; which

E

serve

serve for no other end, but for ligaments to contain the Yolk in an Equilibrium; that it might not by even moving of the Egg be shakt, broken and confused with the White. Wherefore I have often observed I shall here discover, and in it the true manner of their formation.

Fabritius makes mention of a little white Circle, or Cicatricula on the thin Membrane of the Yolk; which he supposes to be a skar, left by the breaking off from the foot-stalk, by which it was fastned to the Hen, before the White grew about it. But if ye further observe it, ye shall finde it another thing. *Parisanus* would have it to be the seed of the Cock. I think it to be the seminal Atomes derived from both here repositied; as the following Observations will discover.

In the Hen, while all her Eggs are but Yolks, or small little grains contained in the Egg-bag, or Vitellary, ye may perceive this white Circle or Cicatricul

Cicatricula, which afterwards, as the Yolk increaseth to bignesse, doth appear more evidently.

When the Egg is perfect, if you break the shell at the bigger end, you shall finde this Circle in all prolificall Eggs; the fashion of it you may see in the first Figure of the second Table, the innermost Figure, A.

This Cicatricula after the first dayes incubation, you shall see dilated and grown wider, as in the first figure at B, with a little white spot in it, easily to be distinguished from the rest.

The second day being past, in the third day ye shall finde it spread yet larger. I have seen it enlarg'd to the breadth of a Sixpence, distinguished with severall Circles within it, exactly round, representing the Eye. The outmost round was of a much paler yellow colour then the rest of the Yolk, and of a thinner consistence, as if it had bin by the heat of the Hen dissolved & melted. Within this was a lesser Cir-

cle of a most resplendent cleerfulness through which did passe some small white threads into the outmost pale circle. This inner clear Circle was of a substance like to the white of the Egg, but clearer, and very fluid. Within this clear round, was another of pale yellow, like to the first; which inclosed another translucent Circle within it, in which was a clear small Body but something obscurer then the inclosure, containing in it a little white spot, easily to be distinguished from it which seemed to be center to all the inclosing circles. This you may see in the second figure of the second Table. The inner white Circle and spot in the after discoveries, will be found to be the Carina and heart of the Chick. The two clear Circles to be that liquor or humor, in which the tender Atomes of the Chick, while they are collecting and conjoyning, do swim in; that by external motions they might not be disordered and hindered from uniting.

om

on. The middle yellow was some of the same matter, not yet dissolved into that clearness. The outmost yellow Circle was some dissolving by the heat of the Hen, and preparing for the making of blood, from which it now differs onely in colour; which the next day or the day following will appear in those small threads, conveyed to the white spot within: which the fourth day ye shall finde filled with this blood, and moving.

Towards the latter end of the third day, you shall finde this Cicatricula to be all clear in the middle Circles, the yellow being obliterated; and now remains onely the white Circle and spot in the middle, somewhat enlarged, circumscribed by a larger resplendent Circle; environed with the outmost yellow round; in which, by the help of Glasses may be discovered the small vessels coming from this dissolved yellow matter, from every side to the middle of the white Circle; which by

a Microscope appears now to be the Carina or back and neck of the Chick and the heart in the midst of it : this is delineated in the seventh Figure of the first Table.

On the fourth day, this Cicatricull was spread the full compasse of the big end of the Egg; the outmost Circle whereof, was filled with veins variously spread abroad, and Arteries as might be supposed, (though by their coats not to be distinguished,) because their Anastomases were evident; which being collected into four trunks from the opposite points, passed through the refulgent clear Circle to the middle or center. Without the extreme limbe of this pale yellow Circle, were no vessels to be seen.

Within the white Circle in the middle, which was much dilated too, appeared a red sparkling line encompassing the white spot, now red too, and moving: whose motions plainly shew it was the heart; as afterwards I saw
by

by the help of a Microscope, exactly shewing me the heart perfectly fashioned, with both his ears, and this red line joyned to it, running quite round in the inside of the white Circle. By the help of this Glasse, I saw the motions of the heart and ears for a long time; one anticipating the other, and continuing after the others decay. When the hearts motion was almost spent, the ears contracted themselves in due order, and after five or six pulsations of the ears, the heart would move once, and then rest again, till after such a number of pulses were performed by the ears.

The heart when it had emptied it self, by its continual pulsation, of all the blood, and was become perfectly clear, and transparent as before the blood came to it; moved a long time after, observing the same order, following the pulsation of the ears, as when it was watered from that bloody Fountain.

This Glasse shewed me the head too, consisting of three bubbles as it were; whereof one confest it self to be the eye, by the manifest discovery of the Pupilla in the middle. From hence the Spina was carried round almost to the head again, which is that transparent white Circle without the red line. From whence appeared some small obscure clouds, fastned in the proper places of the wings and thighs: which in the fifth dayes observation, appeared to be so indeed, without the help of Glasses. Besides, from this Carina, were drawn some small streamings, which were the rudiments of the succeeding ribs. This fourth dayes observation may be seen delineated in the third Figure of the second Table.

The fifth dayes this transparent clear body, together with the Foetus swimming in it, sunk lower to the side of the Egg, then in the day before; and what was then clear and transparent, begins now to thicken and grow obscure.

scure. The head is beyond its proportion grown, outstripping all the rest; as if Nature made haste in finishing that part, of which she should have most and sudden use. The eye grown almost to its perfect bignesse, and discernable in all its parts, the greater divisions of the brain, and Cerebellum easily to be seen. The Carina or Spine discovers it self encompassing the red line or Vena Cava, which was now scarce discernable by reason of that clothing it had by this dayes addition, procured: the heart too, obscurely covered, almost hid from view, excepting a little in the forepart, which seemed open, or at least not so much hardned as the other, but continued tender and cleer still. The wings and legs easie to be observed, without Glasses, being much whiter then the rest. The bulk of the body hardned into a visible form and obscurer then before, yet not so darkned, but that the pulsation of the heart being red with
blood

blood might be discovered through it: which after it had layen still for three hours at least, I afterwards layed it in the Sun, whose vigorous heat renewed its life and motion again. This thin body being opened, from the great vein might be seen some rudiments of the Liver, some small puttings forth of vessels, which had some blood between them hardned. This fifth dayes observation you may see in the fourth and fifth Figures of the second Table.

The sixth dayes observation shews every part more distinctly, and what before even by the help of Glasses seemed but darkly adumbrated; now begin to confess themselves by their visible shapes and actions. The three bubbles of the head are much enlarged, the eyes perfected, the wings and legs grow out: the heart appears fleshy and corpulent, the rudiments of the Lungs, Liver, and Guts, appear more clearly.

The seventh day shews all more perfectly yet, and it now appears in the
shape

shape and figure of a Chick, perfectly accomplisht with all its parts; wanting nothing but confirmation and hardning, which every day now increases, to the diminishing of the white; w^{ch} about the tenth day is done: there remaining little more then that thin clear liquor the Chick did swim in: the yolk entire, and appearing bigger then before; being rarified, and as it were dissolved, by the heat of the Hen: and brought into a fit condition to be by the continuing heat reduced into blood, obtaining from that gentle Furnace, colour, and fluxibility. After which time there is little observable till the fourteenth.

About the fourteenth and fifteenth dayes, the beginnings of the feathers appear, the skin being covered with little black spots, which are the roots of the feathers. The skull begins to cover the brains. The umbilical veins plainly discover themselves: of which the first that was spread through the
white

white of the Egg, passes through the upper part of the Liver, perforating the Vena Cava, near the basis of the heart. The other coming from the yolk insinuates it self into the Vena Porta, in the lower part of the Liver. Which shews what difference Nature hath made betwixt these two liquors: the one, the white, concocted and fitted for present use, is carried immediately to the Vena Cava and to the heart, to be distributed into every part for their encrease and nourishment; out of which every part might select cognate and appropriated Atomes, separated from all excrements, for their augmentation and nutrition.

As soon as this is done and spent; because the Foetus is not yet strong enough to seek his own nourishment abroad; neither is the Hen able to provide for it: Nature hath ordained another reserve of provision, which though it be not so fine, yet having another Cook to dresse it, the Liver
being

being now perfected, it will by undergoing another dressing or concoction there, be made fit for the nourishment of the now hardned and confirmed parts of the Chick. And therefore Nature sends what is melted and dissolved by the external and internal heat, from the yolk to the Liver, by the Vena Porta, to be there drest and cookt again. From whence some excrements are separated, as by the fullness of the Gall, and the green excrements in the guts may appear.

To these two venal Umbilical vessels are added two Arteries, arising from the Lumbar Arteries. Which accompanying the veins throughout the white and yolk, make a perfect circulation here, as well as betwixt the Mother and the Foetus in Viviparis: by which means the new concocted blood mixt with this, is without trouble or danger brought to the Foetus.

And therefore it is (I suppose) that the heart so soon before any other

part

part performs his office; that by his continual motion, driving that dissolved clear liquor, (which is found in and about his vessels, and melted by the external heat) and forcing it into the white, may melt and dissolve that too, and make it fluid, apt to be carried along with it, returning in other vessels back to the heart, where it receives new vigor, and an addition of heat. By this means the liquor being increased, the vessels are not large enough to contain it; and therefore the heart thrusting it forth with the same continued violence, hourly drives it further into the white first, and afterwards into the yolk; where it still melts more, and the dissolved circle is still enlarg'd; as by the daily observations will appear.

After this time you shall finde the white clear liquor, in which the Chick did swim, consumed too; and the Fœtus lying on the yolk, & entire yet, as on a pillow. Whose outward membrane

brane being either united to, or else the same (which is most probable) that closes the Chicks belly, and indeed clothes the whole Chick; holds now both yolk, umbilical vessels, and guts altogether. And as the yolk daily lessens by the growth and increase of the Chick; this membrane is contracted, and the guts with the yolk by degrees are drawn up into the belly, and closed up by this skin; where a portion of it may be seen after the Chick comes abroad, if by dissection it be enquired after, and serves to nourish it, even after it is disclosed. So that in these creatures there is no footstep or signs left of the Umbilical Vessels, or Navel string, as in others; but both vessels and nourishment are inclosed within the belly of the Chick: A figure of the Chick thus formed, some few dayes before his exclusion, you may see in the eighth figure of the first Table.

And now the Chick is perfectly fitted to come abroad, and seek his own provision;

provision; and indeed it is almost time, having spent his patrimony, he must now seek other food: Being straightened likewise within the prison of the shell, and wanting now the air to breathe in; for the allaying that heat which now the moisture being spent) begins to enflame; and hath so dried the shell that it becomes friable, by his continued struggling and turning round, with his sharp beak from under his wing, he breaks through those walls, which now imprison him, and were before his Castle, exactly dividing the shell in the middle.

From these observations of the daily progress of the Chicks increase, we may see the manner of their generation which must be in this sort The seminal Atomes constituting the Fœtus, collected from the blood by the testicles, and joyned together in the womb or vitellary; contract to them from the femal blood that round body which serves afterward for their nourishment,
(as

(as I have related) the yolk, which from several small threadlike vessels, receives nourishment from the blood, until they come to their accomplished bignesse. On which (as I have shewn) these seminal Atomes being fixt, by the former observations you clearly see, how they daily grow up into a living thing of the same species. And this seems to be as the Germen or little plant repositied in every seed; w^{ch} grows up to a bignesse not to be contained within the skins of the seeds, but breaks through that and the earth that covers them; and then shews themselves in a visible form and bulk, which before could not, but by the curious observer, be discovered.

This Cicatricula in the small grains in the Vitellary, seems to be, nay are the same seminal Atomes, disposed in their due method and places which they observe one towards another; as when they appear in a more visible bignesse afterwards. For before they are fate

F on

on by the Hen, there appears in this Cicatricula some distinction of parts: there is a little white spot, in the middle of a white circle to be seen; which particles never vanish, but grow larger still, till they discover themselves what they are. The middle spot is found to be the heart, the white circle becomes the Carina or Spine; at the end whereof, three or four dayes incubation shews the head; and so the rest of the parts as Nature hath need of them grow up to their offices in their visible figures. So that these seminal Atomes as soon as they are conjoyned in a convenient place, by the due ordering and regulating of the specificke soul, put themselves in order, fall to their proper places, and make up a Chick before the Egg be perfected. As the germen in the seed of a Plant (as I have shewn) is perfectly fashioned in the seed, though it discovers not all its parts, till by addition of new particles, they grow to a bigger bulk, and become more visible. The

The first work that is performed by the Hens heat in incubation, is a dissolving and melting as it were of the finer and more spirituous parts, which are most sensible of the first and least heat; by which means the seminal particles are cleared and separated from other parts; and those finer parts appointed for his first nourishment, are clarified, melted, and made fluid, and apt to be moved and dispersed by the white spot or heart.

And this is the true way of generation of these Creatures; whose educations, as well as those of Plants, our Author brings as instances for his equivocal generations. Which as they fail his expectation of clearing those accidentall causes, he so much depends on: so they clearly shew, that as in the seed of a Plant, there are actually such parts repositied, as do make up a Plant perfectly formed. So in an Egg before incubation, where both seeds are conjoyned, the parts of a Chick are orderly

F 2

derly disposed, by the conjunction and regular disposure of these Atomes: which while they were parts of the blood, served for the nourishment and increase of that body from whence they were taken, but now serve to make up another Individuum of the same species.

Of the generation of Animals that are brought forth alive.

Chapter the Ninth.

I Have been something the longer in explaining the former wayes of generation, because as their discovery is easier; so they more plainly illustrate the way and method of Generation. Which, how fitly it may be applyed to those that produce living births, in this ensuing discourse shall be examined.

These, as the former, are the issue of a double Sex; and onely differ in this, that they are inclosed in the female, till they are perfect. I shall not here stand

in the examination of that doubt, whether or no the femal contributes any spermatical particles, towards the formation of the Fœtus, in Coition. When we shal observe what parts Nature hath bestowed on the females; I mean testicles, (for so they are, and not glanduls for I know not what use;) to which are derived Arteries and veins, of the same original with those distributed to the Masculine stones: and when in these testicles ye shall finde spermlike matter, and vessels from them to the womb. When also in coition ye shall observe the same delight and concussion as in Males; why should we suppose Nature, beyond her custome, should abound in superfluities and uselesse parts.

The principles therefore of these living births, arise as the other, from some selected Atoms by the testicles of both, thrown into the Matrix of the Female. Where being united & mixt by the fermenting heat of the womb: the several Atomes fall to their respective places:

the soul playing the skilful Workman (not laying brick where should be mortar) reposing every Atome in his proper place, that very same which it should have held in the body, from whence it was separated.

While this is doing the tenacious part of the sperm, in which these Atomes were laid up, is now hardened into membranes, inclosing several substances; the one inclosing the pure seminal Atomes which are in fashioning themselves, in a clear transparent liquor as in the Egg; the other inclosing both that, and the other parts of the seed from which these Atomes are enlarged and nourished.

This outward Membrane, sticking to, and about those asperities, or papillar extuberancies, which are caused by the orifices of Arteries, and Veins opening into the cavity of the womb gives way to the gently distilling blood to descend to these Atomes; to furnish them with store of cognate parts, to

be selected by, and added to them for their future growth.

But that these yet tender parts, may not be overwhelmed with too great a flux of blood, and be stifled with too much nourishment, before they are able to dispose of it: (a frequent cause of abortion) Nature suffers it to wander through a Labyrinth of an infinite number of vessels, dispers'd through this outmost membrane; from whence by one chanel it is conveighed to this new Animal. But not to remain all of it, within the limits of this little frame; but being conveighed to the heart of the Infant, by its continuall motion some is thrown into every part, according to the capacity of their vessels. And because all parts of this too, are not fit for the repair of these young Atoms, but do require a greater choice; therefore at every motion of the heart, some of this blood is thrown out of this Infant, by appropriated Arteries, back to the Mother again. So that by

this continual circulation of the blood,, through this new Animal; fresh and cognate moisture is supplied to irrigate,, and augment every part of it. From whence, as at the first, cognate Atomes are selected & adjoynd to every particle, until the Fœtus come to perfection; and then breaking through those membranes, it is brought forth a living creature.

It will be requisite I should here satisfie a doubt, which may perhaps perplex some in the receiving this opinion of generation, *viz.* why there should be a distinction of Sexes? and why there should be a collection of these seminal Atomes by both Sexes? and that without the admixture of both these, there could be no generation?

The reason why there are distinct Sexes, is, because one of them must supply the part, and office, that the Earth doth to Vegetables; which is, to contain, preserve, and supply it with
fitting

fitting nourishment; which is done by the Female. But why cannot all be done by this one? what need is there of another seed?

The use of these differing seeds, is evidenced in the former discourse of Plants: where I shewed you, that these seminal Atomes were of two sorts, spiritual, and more material; whose duty was to fix and cement the spiritual Atomes together, that they might mutually cohere the one to the other; the Masculine, are to actuate, enliven, and to act for all the rest: and this diversity of Atomes, makes a difference in seeds, and a distinction in Sexes. The Masculine seed having undergone concoctions and separations by a greater, and purer heat, becomes more spiritualiz'd, & subtile; and is like to those spiritual Atomes of the appearing and rising Plants out of the spirits of a former Plant corrupted, as I before declared. Which contains in it all parts fitting to constitute such a
body,

body, as that was from whence it was taken: and being thrown into a convenient place, where it may have room and agreeable heat, would by the disposing of every Atome into his proper place, constitute a perfect body. But not being furnisht with those more material particles, it would soon vanish (as the appearing supposititious Plants did) these spiritual Atomes not being cemented and conjoynd together.

The feminine seed being extracted after the same manner, from the same vessels, by the female testicles, containing the same particles, but cruder and lesse digested, from a cruder matter, by lesse perfect Organs, is left more terrene, furnished with more material parts; which being united in the womb, with the spiritual particles of the masculine seed; every one being rightly, according to his proper place, disposed and ordered with the other; fixes and conjoynes those spiritual Atomes

tomes, that they still afterwards remain in that posture they are placed in.

I shall forbear the prosecution of this any further, having sufficiently cleared the wayes of generation of perfect bodies. I shall proceed to shew the causes of similitude in the Foetus to the generators, and of mutilated and imperfect births.

How different Sexes, and similitude of the Foetus with the generators is caused.

Chapter the Tenth,

THE conjunction of these seminal material Atomes of both Sexes, causeth this similitude of parts, and marks, with the parents that begot them. For according to the exuberancy, or power of the Atomes of either Sex, so is the Foetus fashioned and distinguished. If the Atomes constituting

ting the Masculine parts prevail, then is a Male generated: but if the Atomes of the Females seed prevail either in quantity, or energy, over the Masculine; then is the product a Female: and those Atomes which were ordained for, and belong to the Masculine parts, being but few in number, and less in power, are obscured, being scattered amongst the rest, or else being of no use, and having no parts to joyn with them, to unite and cement them together, are quite lost.

This is the cause too, why the Fœtus or Infant hath parts, some resembling the Father, some the Mother, having sometimes the Mothers Lip, the Fathers Eye, &c. according to the prevalency of the respective Atomes.

Besides, by how much the more the Masculine Atomes abound in a Female Infant; by so much the more the Fœtus is stronger, healthier, and more Man-like, a Virago. If the Female Atomes abound much in a Male Infant, then is
that

that issue more weak and effeminate. If either parent hath any extraordinary Mark, or part more then usual ; as the Woman with six fingers ; whom our Author relates to have born all her Females, with the like number of fingers : It is caused by these seminal Atomes extracted from the blood, carrying along with them Atomes belonging to every part, communicated to the seed, and so to the Infant ; especially if the Atomes, in which these supernumerary parts or marks reside , prevail over the rest. As the example of that Woman illustrates, who brought forth all her Males with the usual number of fingers ; all her Females with six upon an hand, like her self. The Sex shewed the prevalency of her seed, which having the mastery of the Masculine, all the several Atomes contained in her seed, shewed themselves in the same posture, as in her own body. In the Males, those particles of her seed being weaker, served onely to cement the masculine Atomes, and no more.

The

The cause of defect of some parts, or an ill disposition of them in places they ought not to be in ; may be from the avocation and disturbance of the imagination of the parent, at that time when these Atomes are in disposing and ordering by the soul of the Infant, in their proper places. This I say, is done by the imagination of the Mother disturb'd, representing to the Infants soul, then disposing and ordering these Atomes, either some other pattern by which it conforms its work ; or else wholly calling it away from that operation, suffers these Atomes confusedly to unite and dispose themselves as well, as being disordered, they may ; and so make up a monstrous kinde of birth. Or else the soul being disturb'd, and the Atomes disordered ; they joyn not to one another in their proper places, but the Atomes of the leg joyn with those of the side, or the arm, or the head. Sometimes supernumerary particles are found in the seed, which

which being many and prevalent, do unite themselves, and joyn to some others, and there put forth; so that there are seen sometimes two perfect bodies, conjoyned in one part or other; or four arms, &c. as severall Histories relate of severall monstrous births. That seen amongst us of late years, being none of the contemptiblest of that kinde, I mean the young man that had a head, arms, and legs of another body growing out of his side.

But here arises a great difficulty, how this disturbance of the seminal Atomes, should be occasioned by the disturbance of the Mothers phansie? How the imagination works upon parts of the same body, Authors tell us, is by the mediation of humors and spirits: but how it should operate upon these seminal Atomes, at this time, before there is any influx either of humors or spirits from the body to them? I cannot yet finde satisfaction from any.

I should think it done by the mediation of the soul, traduced with the seeds. Which being of the same essence, and part (as I may say) of the Parents soul; it retains still the same affections and passions that it had before its traduction. Hence the soul of the Mother being disturbed, this soul of the Infant, by that consent and harmony which is betwixt them, must be disordered too: which causes that disorderly concourse of the seminal Atoms, and those monstrous births springing from it: as I before declared.

Some Arguments against this opinion proposed, and answered.

Chapter the Eleventh,

OUR Author brings in an opinion of Doctor *Harvies* to father his accidental formation upon, so much contrary to me, that I cannot baulk the relation

relation and examination of it *viz.* That the seed of the Male, doth not remain in the womb of the Female in any sensible bulk: but (as it seemeth) evaporateth, and incorporateth it self either into the body of the womb, or rather into some more interiour part, as into the seminary vessels, which by mediation of the Females seed, suck up the Males seed, and turn it into a vapour, operating in such sort as our Author before relates, in the generation of Animals. And after a certain time, some six weeks, or two moneths, (as the Doctor observed in Does and Hinds) these seeds distill again into the womb, and by little and little do clarifie in the midst, and a little red speck appeareth in the midst of the bright clearnesse.

The right observation of this experiment (under favor) in my judgement was not truly made; for this inspection into the wombs of creatures cannot be, but by dissection; which must certainly hinder that second work, namely

G

the

the returning back of the seed into the womb: And if so, how shall it come to our knowledge, that the seed, which at the time of accoupling, was received into the womb, and afterwards when the observation was made was evaporated, and attracted by the Females testicles, shall afterwards distill into the womb again; unlesse the same Females were preserved to make those distinct observations, at several times. I should rather believe the Does, or Hinds in whose wombs the Doctor found no sperm after the accoupling, were barren, and so never received the Masculine seed into their wombs, or at least never retained it; or else had not then coupled with the Male. And that after the two moneths, he met with some others that had conceived, in which he found that resplendent clearness and red spot. All which will not amount to a considerable argument, to support this change of substances by accidental causes!

Not

Not unlike to this is that opinion of *Fabricius*, asserting that the seed of the Cock is not cast into the womb of the Hen; but into the beginning of the Matrix, and there by an irradiating influx foecundates the Hen, and makes fruitful all the eggs that shall for a long time after be produced, without any admixture of the seeds at all. This opinion of his is grounded upon the impossibility (as he supposes) of the entrance of the Males seed into the Females womb; the inner orifice being so closely shut, that from without it is impossible to receive any thing. Besides in dissection, he could never finde any part appointed for the ejaculating the sperm into the womb. The Penis or *Prick* being wanting in the Cock; so the seed cannot be thrown further then the entrance into the womb.

Whether or no there be a present union of the material parts of the seeds, after every coition, which impregnates the Females; former observations

have not fully discovered. Those which are casually made by dissection of Females, at, or neer the usual time of coupling, may easily deceive us. For if nothing be found in their wombs then; we may as safely and conclusively argue, that either that Female never coupled with the Male, or never retained his seed as to say it is impossible for the seed to enter, because I never found it there. The experiment ought to be made on some creatures, under the continual view of our observation; and presently after copulation, if we see nothing reflowing again; then to search where that seed lyes, will undoubtedly discover the truth to us.

That observation of Doct. *Harvies*, related to us by Sir *Kenelm Digby*, (though I confesse his curious eye, seldom takes any thing upon trust, or slightly passes by what is observable) seems to presuppose a conception; and on that supposition to ground his opinion, that the Males seed is not retained

retained in the womb, but evaporated; because in his dissections of those creatures he supposed had conceived, (because done at the usual time of coupling) he never found it: till after, some two moneths, meeting with others whose pregnant wombes discovered some rudiments of a growing Fœtus; he concludes, those creatures, he two moneths before dissected, would have shewn then, the fertility of their wombs in the same manner. We may as truly argue (I say) they had not conceived, at the time of his dissection; neither (had they escaped his knife) would they, without a new coupling, have had that red spot, in the midst of that clear body.

But when wee shall consider the great quantity of sperm, emitted by the Male in every coition; and see that quantity retained by the Female, if by that copulation she conceives; and finde no other part capacious enough to keep it, but the

womb: when we shall finde the material parts of the Male, copied out to the life in the Foetus; even his marks, which never came under his sight or knowledge peradventure, to be branded on the young one: we must needs acknowledge something more then an irradiation, or foecundating quality, imprest on the womb by the Masculine seed; and more then phansie in the Females to produce such effects. A Hen trod by a Pheasant, though in a dark room, that so she could never see his proportions or colour, brings forth Chickens, resembling both her self and the Pheasant. A Bitch lined with several kindes of Dogs, though in the dark, where her phansie could not operate to the assimulating of her births, brings forth her whelps fashioned and coloured, like to all those she coupled with. The Horse leaves some material impressions of himself, on the Mule, which he begets on the Asse.

That strict closure of the wombs orifice

orifice in the time of dissection, cannot exclude the seeds entrance. For wee know in the time of coupling in all Creatures, those parts, all of them are much differing from themselves, at other times, dilated, and swollen up by a more then ordinary heat, encreased by an extraordinary afflux of blood to those parts, at that time. Which heat not onely increaseth the desire, but dilateth the cavities and pores that those parts will now be open, which before were shut. The Hen, and Does in coition elevate the Velabrum, which at other times closely shuts that passage. So it will be no marvel, if the straight orifice of the womb in coition shall open, to admit that guest she so much desires; and moves it self directly, to receive what is thrown into it by the Male.

As for his second ground, that the Cock wants that part which should ejaculate the sperm into the Matrix: dissection will shew us that, though it be

not so conspicuous as in other creatures; yet at the termination of each ejaculatory vessel, close by the Orifices of the Ureters, may be seen small extuberancies; which if comprest will be distended to a greater length, emitting seed from their terminations. In coition we cannot but beleieve them much extended, as in all other creatures; which afterwards are flaccide and contracted. So that if we may believe dissection (the surest guide) we shall see Natures bounty to this creature; whose salacity exceeding others, Nature hath bestowd two parts, whereby he may satisfie his desire. And indeed it was necessary so to be, for having no common receptacle, to receive the sperm from both testicles; as the Prostata in other creatures: one Penis could emit but from one stone; therefore are there two, that in coition either by turns, or together, he may emit these seminal parts, from both testicles. The defect of this part

part then will bee no argument to prove *Fabricius* his irradiation only.

I must here take away one stumbling-block more, which our Author hath laid in my way, in confutation of that opinion, favouring the actual existence of all things, in all bodies. Which because it may something reflect on this my opinion of the way of Generation; I shall a little review it.

He to confute this way of Generation and nutrition, furnisheth us with an example to illustrate his Argument; which bears the weight and vigour of his Argument, and may seem very much to infeeble my foregoing Discourse. Suppose (sayes he) a Man, a Horse, a Cow, a Sheep, and 500 more severall Species of living Creatures, should make a meal of Lettice: to avoid all perplexity in the Argument, let us allow, that every one did eat a pound; and let us conceive another pound of this herb to be burned;

as

as much to be putrified under a Cabbage root, and the like, under five hundred Plants more of divers Species. Then cast how much of every pound of Lettice is turned into the substances that are made of them, or that are encreased by them : as how much ashes hath been made by one pound, how much water from another by distillation ; how much a Man hath been encreased by a third, how much a Horse by a fourth, &c. And when you have summ'd up all these several quantities, you will finde them much to exceed the quantity of one pound ; which it would not do, if every pound of Lettice were made up of several different similar parts actually in it, that are extracted by different substances of the nature of those parts : and no substance could be encreased by it, unlesse parts of its nature were originally in the Lettice.

In answer to this, we shall return this confession, that if it were certain
that

that all of so many distinct Species, that have altogether different parts one from another, did, or could from the same quantity of one Plant or thing, receive a valuable bulk of nutriment; his Argument would remain exceeding valid and considerable. But when it cannot be made appear, that every one takes something of the quantity, and is nourished by it. Nay, when the contrary appears, that all are not nourished by the same food: Some choosing one sort of meats, some another; one feeding on, and living by that, which kills another; this growing fat by that, which starves another. It will appear that there is a choice and election of Atomes in that which nourishes, appropriated to the Species for which they are provided: and as well a selection of those Atomes again, to constitute a new Individuum of that Species. In distinct Regions we finde several sorts of Plants and Animals, which are the proper off-spring of those

those countries; which are nourished by things peculiar to that countrey. If they be transferr'd, they either degenerate, or die, wanting their proper aliment; but seldome or never propagate their kinde.

Non omnis fert omnia tellus.

Besides, if it can appear, that many Species are fed with the same thing: it will be found likewise that they are those Species, that have many or most parts resembling one another. And then no doubt in the same aliment, they may every one finde particles fitly applicable to those corresponding parts: and no lesse able to constitute their members, then others.

It may yet be objected; If the seminall Atomes do so dispose themselves in their due and natural orders, as to make up a body resembling the Species; or at least to lay the first foundations, and rude draught, as it were, of a Body. Why are they not

not thus disposed, and settled in the seminal vessels of both Sexes, as soon as the sperm is made? There wants neither heat nor life to actuate them.

To this I shall answer; first, that perhaps if these seminal Atomes had convenient room in those vessels, they might be conjoyned in an orderly method. And therefore Nature hath so ordered these vessels, that the parts, both separating and containing these Atomes, should not be one continued cavity as the Matrix is, which receives them in cotion; but should be a glandulous and porous body; in which the particles or Atomes of the seed lie scattered, and parted one from another by the substance of the glandule. For first, these Atomes are separated by the testicles, a glandulous body; next, they are conveyed to the Prostata, a glandule too; in which they are reserved until the time of use. In the Ejaculatory vessels, their
passage

passage betwixt the testicles and Pro-
 stata; though they circulate through
 divers Meanders, and Cavities; yet
 there they cannot rank themselves in
 order, because they are in continual
 motion, (the subsequent particles still
 driving on the former) which hinders
 their conjunction; rest being the Mo-
 ther of Union. Those seminal vessels,
 which in dissections are found joyned
 to the Prostata, having many Cavities,
 and full of thin liquor, do not contain
 these seminal particles, but the Pro-
 stata, (as I said) and from thence in
 coition are they emitted. The liquor
 that is found in these seminal cavities,
 supplies perhaps (besides that other in
 coition) the office of the thin transpa-
 rent liquor in the Egg, in which the
 Chick swims, and by which the finer
 parts are nourished at first, that is first
 concocted into the blood.

Besides, these Atomes in their orde-
 ring must (I said) be regulated by the
 soul, traduced with them; which is
 not

not fastned to the seed, while it remains in the seminal vessels, more then to the blood, or other humours in their chanel, on whose losse or preservati-on the soul doth no way depend.

Neither in all emissions of sperm, is the soul conveighed with these seminal Atomes, that in any place it may constitute a body. In all involuntary emissions, the soul is not communicated to the seed. But then onely, when the generators soul by a voluntary act, intent on propagation and multiplying her self into another Individuum, diffuseth her self into the now parting sperm, then only is it prolificall. Which coming into a convenient receptacle, where these Atomes may repose; being moved onely by that soul which accompanied them, and from which they received their orders and commands, are soon settled into their proper places, and become a perfect Individuum of that Species.

Thus have I discovered the wayes of generation;

112 *The History of Generation.*

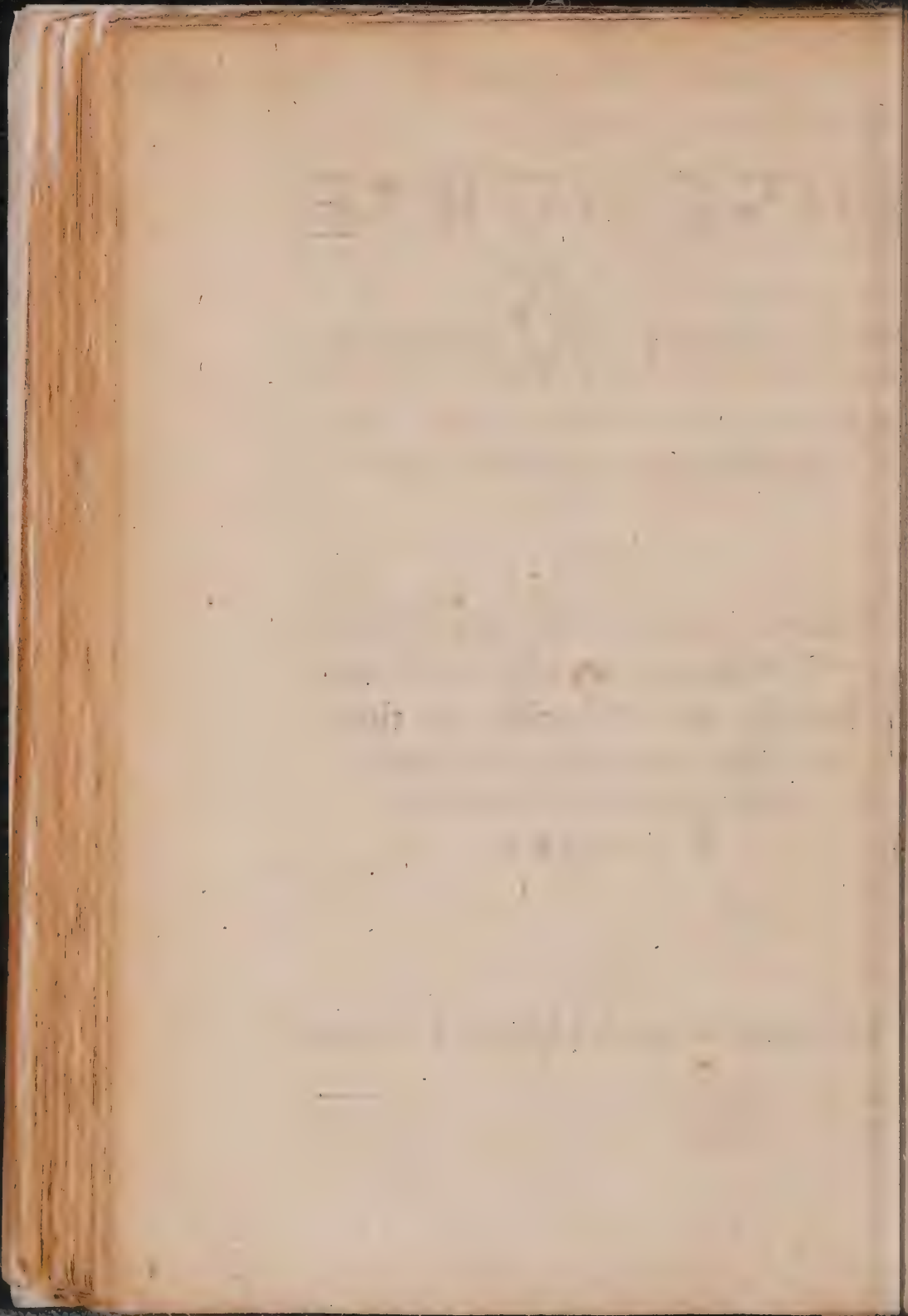
Generation; which being cleared to
of all those doubts, that could be rai-
fed against it; will easily pronounce,
that phansie of our Authors, to be butt
the issue of an acute wit, not the birth
of his maturer judgement. If in this
Discourse I have erred, I shall not
marvel at my humane frailty, but hope
to finde as favourable a Censure.

FINIS.

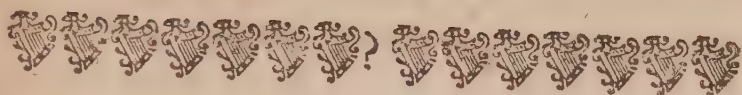
A
DISCOURSE
OF THE
Cure of Wounds
BY
SYMPATHY.

OR,
Without any real application
of Medicines to the part af-
fected; but especially by that
Powder known by the name
of Sir GILBERT TALBOTS
POWDER.

By
NATH. HIGHMORE Dr. of Physick.



W
Sy
T
We
on of
will
Tru
had
h
v
an un
p



THE
Sympathetical Cure
OF
WOUNDS.

THese universal and general Laws of Nature being laid down, and rightly understood, the Cure of Wounds without Topical Application of Medicines, to the part affected, will soon appear an unquestionable Truth, and not a Magical delusion, as hath bin supposed: and by some, whose laborious Pens have endeavoured a conviction, most unjustly bin stiled diabolicall.

1. First, it is absolutely true, and an unquestionable law of Nature, (if, prejudice laid aside, right reason takes

H 2

her

her place,) that all actions and motions are performed by *Atomes*, or small bodies, moving after a different manner, proportionable to their severall figures; and not by I know not what qualities, (which have onely a notional subsistence,) acting without the bodies to which they belong, and leaping from one subject to another, without changing their forms.

2. There is a constant *Effluvium* or expiration of such *Atomes* from all bodies: caused by a compression of other Circumjacent bodies; driving the parts closer together; or else by the intion of other *Atomes* crowding into the porous parts of that body; disturbing the repose and quiet of the former inhabitants, and thrust them out, to wander about in the air, till they meet with some other body of the same nature, or return to the same body from whence they were driven, where they may obtain their desired rest a while, which is but very short.

This

5. This expiration, some by the help of Glasses, have seen in the form of a mist to flow from a Loadstone, and other bodies whose aporcheas are more plentiful: In bodies that are actually hot, this Effluvium is sensibly apparent to the smell, especially to Creatures of an acuter sense; whose expirations hanging in the air, or upon the ground; are as sure a guide to the persecuting Dog, as if they were continually in his eye. *Sanctorius* teacheth us too, that they are no lesse sensibly discovered by weight, who affirm, a Man in one nights space to be lighter by three pounds weight, then he was at the beginning of the night, caused onely by this insensible expiration.

3. These Atomes are not of one Figure, nor of one magnitude or grosseness: some being so subtile and slender, that they admit of no opposition, but continue their course through all mediums: and whatever may seem

H 3 to

to oppose them in their way, such are not discovered by us, but by their effects; they penetrating, and acting what their Figure can do, before we are sensible of them: such are the contagious Atomes of bodies infected with the Plague, or other pestilential diseases; which are not only communicated to others, by their harbouring in the visitants clothes; but being dispers'd in the air, are convey'd to remote places and persons, on whom they exercise their tyranny, not discovered till they break out into open violence. Others again are grosser, and cannot so easily passe by, or through others of the same or greater grosse-ness: and are therefore driven by the strongest, and inforc'd from their intended voyage; and sometimes beaten into the pores of other bodies. And such Atomes are apprehended by our senses, as heat, cold, smells, colour, &c. & move more slowly then the former. Some are so grosse that they
move

move solid and fixt bodies out of their places, as the winde; and many others that are driven to and fro by the winde, as it moveth, they change their place. These Atomes we are sensible of, and shall without much difficulty, be perswaded to confesse their being and activ ty. The magnetick effluvi-ums, and influences of the Planets, the subtile expirations of all bodies, especially those which are not raised by the attenuating of much heat are to be ranked in the first Classis, and have been heretofore Christned by the name of *Occult qualities*. The others have been stiled prime qualities, vapors, exhalations, or the like.

4. It is another general Law of Nature, that all bodies desire rest; and would continue in their own proper places, if they were not disturbed by an intruder: Rest being the Mother of union, which is the desire of all natural bodies.

5. There are some places more fit

for the receiving and holding of some bodies, or Atomes, then others; in which they may better and longer rest. And that in respect of the fashion and form of the pores receiving them; being proportionable, and more agreeable to the figures of the Atomes. As some Atomes are Angular, some Cylindrical, branched, smooth, sharp, rough. There are in bodies pores agreeable to these figures; so that some Atomes shall bee received into pores proportionate to them, others excluded; as the fire, sharp and penetrating Salt, creep into the pores of a Stone; which the Atomes of Water, cold, and light, cannot: the infectious Atomes of that pestilential disease amongst beasts, called the *Murren*, insinuate themselves into Cows and Swine, not into Horses, or Men, as the infection of the Pox or Measils in Men, is not communicated to Beasts, &c. This agreement betwixt the pores and the Atomes, makes that, we call *Cognition*.

No

6. No Atomes rest any where, but in those cognate or proportionate pores. They may be driven into other bodies, or may accompany other Atomes, into pores that do not exactly correspond with their figures, but cannot rest there; being still thrust out by those that do better fill up that place, and correspond with the capacity and proportion of those pores; and hence ariseth a natural inclination and tendency towards those bodies where such pores are. For being once dislodged, and thrust out of those cognate places, they are still shouldered out, and prest to give way for those Atomes, whose figures claim a right to those pores they are now wandring in: being thus thrust out, & prest on every side by other dislodged Atoms, they are inforc'd to move that way where they finde least crowding, and where the violence least urgeth; and that is on the side where these pores are, and perhaps from whence they were first disquieted. For other Atomes not finding
entrance

entrance into the pores of such bodies, rebounding back, cause other behinde them to rush into their place, to give way for them rebounding; who likewise not being entertained, return too, thrusting others into their room: till at last it comes to the turn of those cognate Atomes: who being violently thrust on by those behinde them, are also now by these that were before them, returning; are prest upon these proportionate pores, who in respect of their cognate figures, finding admittance by their entrance, make way for others of the same proportion to follow them. So that there is a constant necessitated motion of such Atomes this way, forc'd by the impulsion of other Atomes. Which motion is natural too, in respect of the cognation betwixt the place and the Atomes, though in respect to other Atomes, and the force imprest by them, it be violent and forc'd. And this is that motion which they say is caused by *Sympathy*. Such are all magneticall motions,

motions; amongst which likewise may be ranked these Atomes curing at a distance.

7. No distance hinders the motion of these Atomes towards their natural places. For no pores agreeing with their figure, but their own, that are proportioned to them, they will still be thrust out by those Atomes which are fitted for those pores in which they are: so that being enforc'd by the pressure of others to move from one place to another, they will still keep on moving that way whither they are thrust, till they come to a place proportionable to them where they may be freed from this violence. So that as the large sphere of magnetical motions may not seem wonderful, so neither rightly can this sympathetical motion of these curative Atomes be accounted magical. if they cure the part they seem not to touch.

8. The nearer these Atomes approach to their desired home, the resistance is still lesse on that side, and the pressure
greater

greater on the contrary, and therefore their motion is swifter, in a shorter distance, and also slower at a greater.

9. There may be, and oftentimes is a Conjunction of Atomes, which in their Pilgrimage, flie on the back one of another, and may and do operate together: as the Winde doth carry with it many infectious Atomes, and sometimes rare and comfortable smells.

These things premised and layed as foundations of truth, which can (if examined with an unbiaſſed judgement) appear no other; they will demonstratively illustrate this way and cure of wounds without any topically application. It remains therefore that wee explain the manner of this operation; what the Medicine is, and why it workes more effectually at a distance, then if applyed to the part.

First, the Medicine is made of a
Zaphyrian

Zaphyrian Salt, calcined by a celestial fire, operating in Leo and Cancer, into a Lunar complexion. The heat must bee such, that it draws out all adventitious moisture, leaving it intensely dry, and in this condition it must be kept. If at any time it meets with any moisture, it loseth its energy, and must to the æthereal fornace again, it must be such a proportioned heat, and not a greater; for by excessse of heat, all the volatile parts and finest Atomes, which onely work this cure, will bee evaporated: and onely the grosser saline parts remain, which neither can be raised to accompany the Atomes of the blood: neither if they could, would they cure; but by their sharper angles, grate the orifices of the capillary veins, and so procure an efflux of blood, and not a consolidation of the wound.

The substance of this medicament being joyned wth other unctuous bodies, is
applied

applied to the wounds themselves, in most cicatrizing and drying emplasters. Which when the sharp angles are blunted by the unctuousnesse of the adjoynd medicaments, doth dry up, and unite the wounded parts most effectually, as in the emplaster called Diapalina, &c. Much more effectual then must the finer active volatile particles be, when they are separated from those more earthy, clogging parts; and conveighed into the remotest pores of the wounded part, by the help of the bloody Atomes returning home: upon whose score they finde a far greater and more welcome entertainment, then if they came alone, or joyned with any other Forrainers.

The manner of applying the medicine is in this fashion. The blood, or bloody matter taken from the wound on a cloath, must be lightly covered over with this powder, kept very dry; and afterwards wrapt up close from the air, and so kept in a temperate heat; neither

neither must it finde any mutation to either excessse; the wound in the mean time must be kept clean, and clothed up with drie clean clothes. If it hath been an old sore or ulcer, that Nature hath found a convenient passage to vent the burden of her excrements that way, and there be a tumor, (as necessarily there will be) the first dressing doth most violently drein this Fountain, and you shall finde the wound to run most strangely: afterwards when the matter is lessened, and is reduced to such a proportion as nature and the medicine may conveniently buckle with it, then it turns it into laudably concocted matter, which every day lessens, and the wound closeth. Put if the wound be fresh, the applied medicine presently stoppeth the blood, and hinders an afflux of humors to the part. So that there is nothing to be done, but the uniting the severed parts, which this medicine doth in a wonderful short time.

The way which these balsamical Atomes

Atomes of the Medicine, applyed to the blood, take to come to the wounded part, is next to be shewed. All action being performed *Applicando activa passivis*, either by a real or virtual (which indeed must be reall too) contact, it must needs make this cure suspected; because the medicine being applyed only to the blood, there appears to be no kinde of contact, & therefore it should follow, that there is no operation or action upon the wound; especially when the wound is at so great a distance from the medicine.

But if we shall review the former Laws of Nature, the contact will soon appear to be as real, as that made by the Sun darting his beams into any of these inferiour bodies, though thousands of miles remote from it. The medicine therefore being a body constituted of several particles, it will necessarily follow, that there is an effluvium, or constant expiration of Atomes from it, by the second law of Nature, And by the
ninth

ninth rule these may be conjoyned with the Atomes of blood extravenated, and accompany them in their flight. Nay, they must joyn with them, for the Medicine being Salt, when it comes to imbibe the moisture of the blood, is (as all Salts will be) dissolved, and perfectly mixt together with it; which being kept in a constant continued heat, are continually breathing forth insensibly Atomes from both. Being thus united and exposed, the particles of blood being most, and most active, they carry their companion along with them. Who by the sixth and seventh rules, must of necessity be driven to the wounded part, though remote from it a very great distance.

When these companions the Atomes of the extravenated blood,
I and

and the Medicine are come to the wounded part, the Atoms of the blood are received, finding an easie entrance at those cognate parts, those proportionate pores; with which covertly slips in the other of the Medicine; who meeting there with more moisture, presently delivers up its saline part to bee conjoyned with those new moist parts; which by the addition of these newly resolved salt particles, become more fluid and loose, fitter to bee driven out, which is suddenly done. For besides this loosening the superfluous matter in the wound, the Medicine hath such parts as contract the solider parts neerer together and so shuts the orifices of the veins, that the efflux of blood and humors thence, is presently stayed; and the pores being lessened this superfluous moisture which hindered

hindered the union of the parts, is prest out, so that the wound is more easily soadred up. Which worke is quickly performed by Nature her self, when there shall be nothing to hinder the apposition of such fitly prepared particles, as shee hath provided in every part for their nourishment and augmentation. This double work of the Medicine, the loosening and diluting the fluid parts, that distend the pores of the wound, (which causes that pain, which is an inseparable companion of separation of continuity) as likewise the constriction of the pores, and joyning the more solid parts neerer together; is demonstrable in all Salts, when they are laid on bodies retaining any quantity of moisture in them. For Salt layed on meat, causes first a great quantity of bloody water to flow

I 2 from

from it ; after which you shall finde the flesh harder, and shrunk closer together : and at last, if it continues long, the moisture is clean dreined out of it. So in the making of some Syrups, if upon Limons or Apples sliced thin, you strew Sugar (which is a kinde of Salt) it will drein out all their moisture, and leave them dry and hard. This being done by ordinary Salts, wee must expect a far greater & speedier operation from this, whose parts claim a greater activity in binding up and closing, then any Salt, as every tongue will soon confesse that toucheth it, either before or after its preparation. It will be no wonder then, to see so large an efflux of Matter from an Ulcer, till all bee consumed, after the first dressing of the cloth; or to see so sudden a stop
given

given to the blood flowing from the wound.

The cloth in which the blood and Medicine are kept, must bee wrapt up close, and kept warm in a temperate heat, not declining to either excesse. First, because the cold doth prohibit the expiration and breathing forth of these Atomes, so that the wounded part is for that time destitute of those balsamical Atomes, which should drein forth the superfluous humidity, and restrain the afflux of blood, and other humors to the part. So that the blood flowing to this weakned part, distends its pores, and vessels again beyond its natural and accustomed limits, and rends asunder what was almost united before And this is that which causeth that pain, occasioned by exposing the clothes to

to the cold air. Besides, this hindring the efflux of these apor-rheas from the cruentated cloth by cold, there may bee some extraneous Atomes; (as those of cold or icy parts, whose activity in penetrating of bodies, I conceive to bee little lesse then those of fire,) which being conveyed along with these Atomes from the cloth, more slenderly now transmitted; may disaffect the wound, according to the figure and nature of the Atomes: as may appear by that story of Sir *Kenelm Digbies* usage of Master *Howels* cruentated Garter, heating it over coals in a dish of Vinegar; which put the lame Gentleman into extreme pain and torture; but upon the removall of those, and the fresh dressing of the Garter, hee presently received ease, and in a very short time a perfect Cure.

The

The other extreame, viz. of heat, doth as much exasperate the wounded part, as may appear by this story, as well as by another, from a very credible Reporter, who in the cure of some Scrophulous Ulcer by this powder, had almost perfected the Cure; the Father still keeping the Cloth in his pocket; but being to lodge abroad one night, left the Cloth with this Gentleman; who dressing the Cloth, as before, in the morning put it up in his owne pocket, and kept himselfe by a great fire all that day; and at night, laid it in his bed, under his sheet onely, and so kept it extreame hot. The Child which had before continued in very good ease since the first dressing, all that afternoon and the night following was extreame tortured, and slept not at all. In the

morning when he came to dresse the Childe again, hee found the wound had bled much, and was very sore : but dressing the Cloth again, put it up in his own pocket; and so returned to his good fire; the Childe continuing in extreameity of pain, they sent their servant to acquaint him with it; who presently apprehending, that the change of the keeping of the Cloth might bee the cause of it, gave the Cloth to the Boy to put it in his pocket : who following his imployments, came not to the fire at all, and in a quarter of an hour after, hee found the Childe playing, and in very good ease. The reason of this was not onely because there were many fiery particles joyned with these Atoms, which inflamed the wound; but because the extreame heate working on the matter and Medicine

dicine in the Cloth, in an unusual manner, raised a far greater number of these saline parts then usually; which when by the sanguineous Atomes they were introduced, did by their sharp angular parts shave and corrode the small orifices of the veines; and gave way to that efflux of blood, and by their sharpnesse lay continually pricking and dividing the tender parts, which was occasioned by some of grosser and more fixt parts.

This Cure, by this Atomical energy wrought at a distance, is more sudden, then any the most excellent Balsame could perform, or then the substance of the Medicine it self, applyed to the part could do. For first, as I said, the Medicine being a calcined Salt; the sharp part of it would
erode

erode the orifices of the small vessels, which in all wounds are divided; and would prove rather corrosive then curative. But being thus transmitted with the united Atomes of blood, they steal in undiscerned, and by the vertue of that cognation betwixt the Atomes of the blood and the pores they are to enter, they are more freely entertained, and admitted to passe and insinuate themselves farther, then if they came alone; whose disproportioned Atomes would scarce finde an entrance there, without the other. Being thus freely admitted into every pore, and being but the finer volatile particles, whose angles though keen, yet have not that hardnesse to fret off the tender mouthes and termination of veins: First, they dilate the superfluous humid parts,
and

and make them fit to be expelled : then by their more than ordinary restrictive power shrink together the pores, and squeeze out that humidity, and glew together those disunited parts. And thus in a very short time is the cure performed.

The easing of the Toothach by this Medicine too, is performed by its Atoms, repelling those humors which were flowing to, and distending the thin, and most accurately sensible membrane, including the Marrow of the Teeth. Which is done by closing and shutting the pores, that the already imbibed humours must be exprest, and others that are flowing, are prohibited from entering.

Thus

Thus have I cleared what to Philosophers seemed one of Natures Cabbinet-Secrets, but to others, that condemn all they understand not for Magicall, it hath seemed, and been accused to have been done by some diabolicall compact. There have not been wanting some, that have laboured to undeceive mens understanding, and to clear the proceſſe of this cure: but upon principles, I confeſſe, of as much difficulty, and that require as great a portion of faith to believe them, as the thing it ſelf. Their miſfortune hath occaſioned mee to look ſomething more narrowly into the true principles of Nature; which though I ſhall not beg to be granted mee gratis; yet I ſhall appeal to every mans reaſon (by which Rule I would have

have them examined) whether they do not truly agree with the usuall wayes of Nature, by which shee constantly workes : if upon any ones just tryal they shall appear to be erroneous, it shall not grieve me to become his convert, recanting my mistakes.

FINIS.





21



